MODULE - 1

Economics is a social science. The aim of social science is to study different accepts or activities of human being in the society. Social studies has several branches and each study an analysis and definite accepts of human activity. Therefore, we need to study the scope, subject matter of different subject including economics. Thus, economics helps in the study of mankind. It helps how to lead a good life in the society by making the best use of resources and hand.

Resources made check form of money, labour, capital, energy which are limited in nature. Thus economics help us how to make the best use of all these, so as to get maximum satisfaction. Thus economics is a social science which describes the factors that determining concepts like production, distribution and consumption of goods and services.

The term economics is derived from 2 words oikes meaning household and nomous meaning loss/rules. It means rules of household management.

Engineering economics is a subset of economics with a use and application of economics principle in engineering phenomenon. It is a branch of microeconomics which deals with the decision regarding allocation of limited resources. Thus economics in engineering field helps in formulating, planning, estimating and evaluating economic outcomes. When alternative to __ accomplish a definite purpose is operable.

Classical economics — Adam Smith the father of economics in his book and enquires into the nature and the causes of wealth of nation define economics as a science of wealth. It enriches both people and the king.

J. B. Say — In the year 1803 he define economics as a science of production, distribution and consumption of wealth.

Alfrid Marshall — In his book principal of economics define economics has a study of mankind in an ordinary business of life. It examines that part of individual and social action which is closely connected with the attainment and with the use of material requisite of well being.

Thus it is a one side the study of wealth and on the other side the part of study of man.

Liomal Rubbin — In the year 1932 in his book nature and significance of economics science gave the definition. He said economics studies human behaviour as a relationship between ends and scares means which have alternative uses.

2.12.21

1. Basic problem of economics
   a) Allocation of resources
   b) Method of production — Method of production involves the choice regarding the use of either labour intensive technique of production or capital intensive technique of production.

   Labour intensive means use of more labour or less capital or machinery and capital intensive means use of more machine and less labour.
   c) Distribution of goods
   d) Utilisation of resources
   e) Capacity to produce.

2. Scope or subject matter of economics

   The subject matter of economics can be derived from different definition of economics. The definition starts with the existence of unlimited wants. These wants has to be satisfy by resources.

   Resources can be earned by making efforts people walk in order to earned resources.

efforts → satisfaction
↑   ↓
← want ←
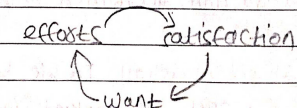
So, the subject matter of economics centres arround wants, efforts and satisfaction. The activities which are necessary to satisfies

wants increase efforts and maximize satisfaction are called economic activities. Thus economic activities are traditional divided into production, consumption, exchange, distribution, money banking and international trade.

Consumption – consumption means the use of resources for the satisfation of human being. It means distruction of utility by human being. The study of consumption includes the study of human wants there characteristics laws which provide maximum satisfaction out of limited income.

Production – Production is possible by combination of 4 factors of production. Production means creation of utility to satisfy human wants.

   Creation of utility maintain the form of time utility, place utility and form utility.

   In this chapter we will study the methods and characteristics of factor of production how to produce maximum with minimum resources.

Distribution – This includes distribution of income among varies factors of production where land will get rent, labour will get wage, capitalize get interest, the organizer will get profit. This includes the law governing the pricing factor of economic.

Exchange – Economic needs exchange to be study in various forms of market and its characteristics and how the price determine in various forms of market.

Demand
- Meaning or definition   – Elasticity of Demand
- What is demand func^n [measurements]
- Determinants of demand
- Demand schedule [Types]
- Demand curve [Types]

Demand is an effective desire backed by willingness to pay and ability to pay at a particular price and particular time.

Different factors determination & factors affecting demand

1- Price of the commodity (P) – The demand of commodity is inversly related to its price.

2- Income of the consumer (Y) – Income of the consumer and quantity demand directly related. So, it is a natural phenomenon that when income increases demand increases exception is inferior goods. Ex – salt.

3- Taste, habits and Preference (T)

4- Price of related goods (P_{xy})

a. Substitute goods – This are those steps of goods which can be used in place of other. Ex –

	X	Y
	Tea	coffee
	$P_T \uparrow$	$D_C \uparrow$
	$P_T \downarrow$	$D_C \downarrow$

When Price of tea increases the demand for coffee increases and when price of tea decreases the demand for coffee decreases.

b. Complementary goods – When 2 things go together.

Ex –	X	Y
	Petrol	car
	$P_P \uparrow$	$D_C \downarrow$
	$P_P \downarrow$	$D_C \uparrow$

When price of petrol increases the demand for car decreases and when price of petrol decreases demand for car increases.

5- Future expectation of Price (F)
6- Market Policy of government (G)
7- Advertisement
8- Climate
9- Population

Demand func^n

$$D = f(P, P_{xy}, T, Y, POP^n, Adv, \dots)$$

Demand func^n shows the cost and effect relationship between quantity demand and the factors affecting it.

Demand schedule - It is a tabular representation of list of Price and quantity demand for a commodity.

Px	QDx
10	100
20	75
30	50
40	25

1- Individual demand schedule - It shows the tabular representation of Price of commodity and quantity demand for a single consumer in the market.

PxA	QDx of A
10	100
20	75
30	50
40	25

2- Market demand schedule - Market demand schedule shows the tabular representation of Price of commodity and quantity demand for it by a number of consumers.

It shows the relationship bet^n quantity demand and price for a periodic time in the market. It is the submersion of individual demand

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schedule because a number of buyers and seller are their for a commodity having there own demand schedule.
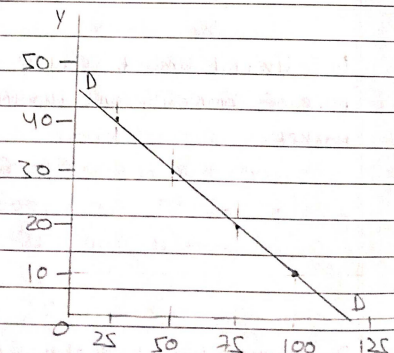
<u>consumer 'A' & 'B'</u>

| Px	QDA	QDB	MD A+B
10	100	50	150
20	75	40	115
30	50	30	80
40	25	20	45

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Demand curve - Demand curve is the graphical representation of demand schedule. Each Point on the curve represents a Particular combination of Price of the commodity and quantity demand for it. The demand curve slopes downward from left to right.

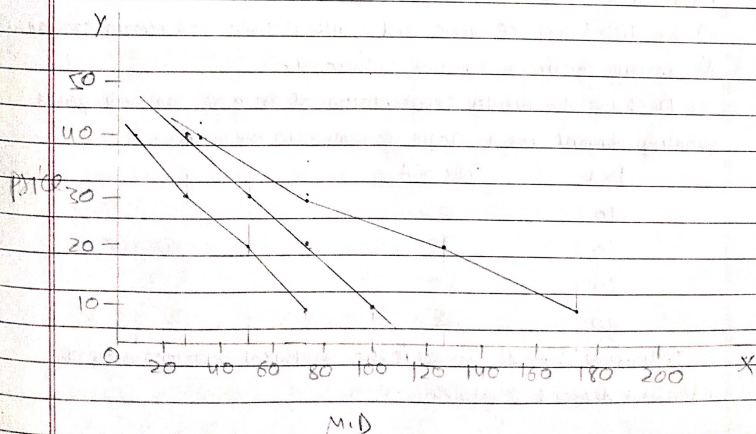| Py	Dx
10	100
20	75
30	50
40	25

Types of demand curve

1- <u>Individual demand Curve</u> - Individual demand curve is the graphical representation of individual demand schedule.

Py	DY
10	100
20	75
30	50
40	25
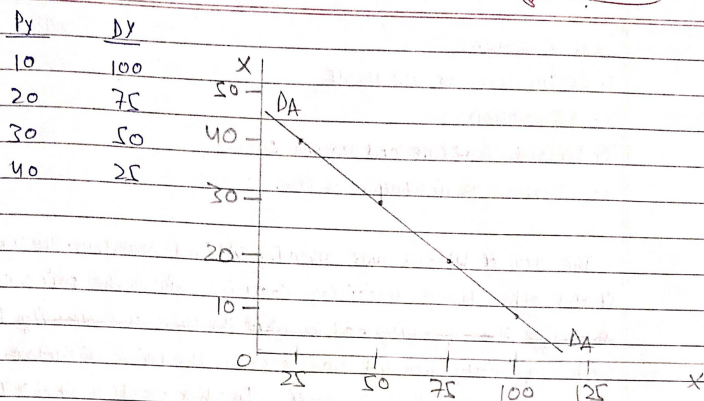
2- Market demand curve - Market demand curve is the graphical representation of market demand schedule.

Px	DA	DB	MD
10	100	75	175
20	75	50	125
30	50	25	75
40	25	5	30

M.D

Law of demand

1. Definition or law itself
2. Assumption
3. Demand schedule and demand curve
4. Exception or limitation of law.

The law of demand was given by Alfred Marshall. The law of demand states other things remaining constant higher the price of commodity ...... the smaller is the quantity demand and lower is the price of commodity the larger the quantity demand of commodity. In other words it states the inverse relationship between quantity demand and price.

Symbolically $Dx \propto \dfrac{1}{Px}$, $Dx \rightarrow$ Demand for commodity x,

$Px \rightarrow$ Price of commodity x.

a) The consumer is a relational human being.
b) His taste and preference remains constant.
c) Income of the consumer remains constant.
d) Price of related goods remains constant.
e) The size and composition of population remain constant.
f) The distribution of income and wealth is given and remain constant.
g) Climatic condition remains unchanged.

It shows the tabular representation of price of commodity and quantity demand for a single consumer in the market.

PxA	QDx of A
10	100
20	75
30	50
40	25

Individual demand curve is the graphical representation of individual demand schedule.

Py	Dy
10	100
20	75
30	50
40	25
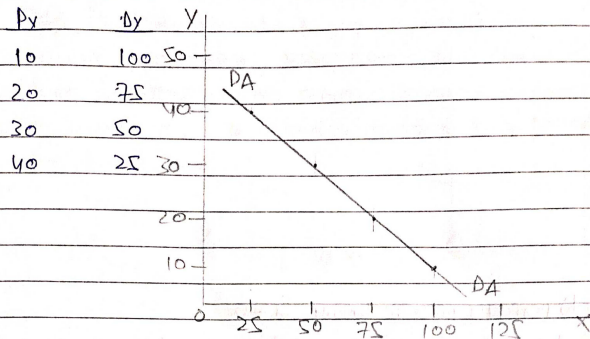
a) Giffen good   b) Prestigious food   c) Expectation of Price change
d) Essential goods.

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Elasticity of demand – Elasticity of demand shows the degree of responsiveness of quantity demand due to change in any factors affecting it. There are 3 kinds of elasticity of demand are:-
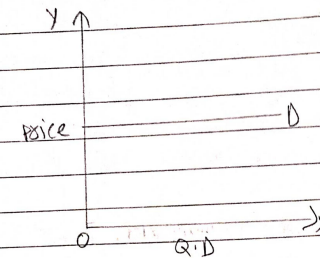1 - Price elasticity of demand   2 - Income elasticity of demand
3 - Cross elasticity of demand

1 - **Price elasticity of demand** – Price elasticity of demand shows the degree of responsiveness of change in quantity demand due to a small change in price.
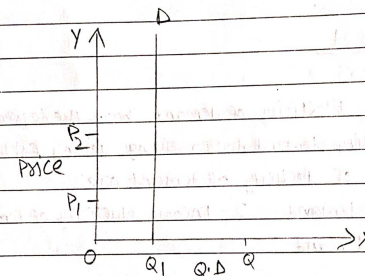
Types
a) **Perfectly elastic demand** $E_d = \infty$

Demand is said to be perfectly elastic when a very small change in price produces an infinite change in quantity demand. The price elasticity of demand is equal to ∞. The demand curve DD is parallel to x-axis.

b) **Perfectly inelastic demand** $E_d = 0$
A perfectly inelastic demand is one in which a change in price produces no change in quantity demand. The price elasticity of demand is equal to 0. The demand curve is vertical straight line parallel to y-axis.
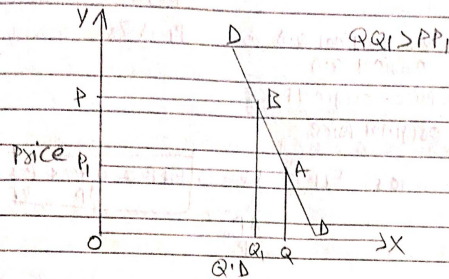

c) **Unitary elastic demand** $E_d = 1$
It is a situation when a given change in price produces an equal and proportionate change in quantity demand. The price elasticity of demand is equal to 1. The demand curve take the shape of rectangular hyperbola. Here $PP_1 = QQ_1$.
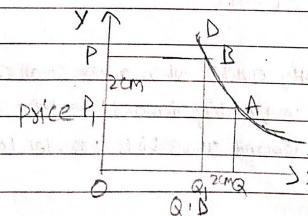
d) Relatively Elastic demand $E_d > 1$

Demand is said to be relatively elastic when a given change in price produces more than proportionate change in quantity demand. The change in quantity demand QQ_1 is greater than change in price PP_1. The demand curve moves flatter downward.

$QQ_1 > PP_1$

e) Relatively inelastic demand $E_d < 1$

Demand is said to be relatively inelastic when a given change in price produces less than proportionate change in quantity demand. In the diagram QQ_1 is less than P_1P. The demand curve is steeper downward.
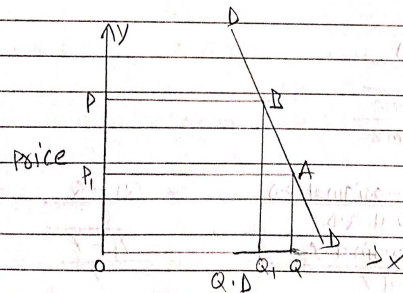
Formula for price elasticity demand

$$E_dP = \frac{\text{Percentage change in quantity demand}}{\text{Percentage change in price}}$$

$$= \frac{\dfrac{\text{change in quantity demand}}{\text{original Q.D}}}{\dfrac{\text{change in price}}{\text{original price}}}$$

Symbolically

$P \rightarrow Q_1$
$P_1 \rightarrow Q_1$

$$E_dP = \frac{\dfrac{\text{New Q.D} - \text{original Q.D}}{\text{original Q.D}}}{\dfrac{\text{New Price} - \text{original price}}{\text{original price}}}$$

$$= \frac{\dfrac{Q_1 - Q}{Q}}{\dfrac{P_1 - P}{P}} \quad \text{or} \quad E_dP = \frac{\dfrac{\Delta Q}{Q}}{\dfrac{\Delta P}{P}} \quad ; \quad \boxed{E_dP = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}}$$

2 - Income elasticity of demand (E_dy)

$$E_dy = \frac{\text{percentage change in Q.D}}{\text{percentage change in income}}$$

$$= \frac{\dfrac{\text{change in Q.D}}{\text{original Q.D}}}{\dfrac{\text{change in income}}{\text{original income}}}$$

$$E_dy = \frac{\dfrac{\text{New Q.D} - \text{original Q.D}}{\text{original Q.D}}}{\dfrac{\text{New y} - \text{original Y}}{\text{original Y}}} = \frac{\dfrac{Q_1 - Q}{Q}}{\dfrac{Y_1 - Y}{Y}}$$

$$E_dy = \frac{\dfrac{\Delta Q}{Q}}{\dfrac{\Delta Y}{Y}} \quad \text{or} \quad \boxed{E_dy = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}}$$

6

a) Positive income elasticity of demand - In this case change in demand and change in income moves in same direction. If there is increase in income, there will be increase a quantity demand and vice versa.

b) Negative income elasticity of demand - In this case change in income and change in demand occurs in opposite direction. If there is increase in income, then there will be corresponding decrease in quantity demand for the commodity.

c) Zero elasticity of demand - This occurs when there is no change in quantity demand due to change in income.

3- Cross elasticity of demand - In this case it shows : the ratio of the proportionate change in quantity demand of commodity X in responce to a given proportionate change in price of some related commodity Y. It may be calculated from the following formula :

$$\text{cross elasticity of demand } X \text{ and } Y = \frac{\text{Proportionate change in quantity demand of } X}{\text{Proportionate change in quantity demand of } Y}$$

$$= \frac{\frac{\text{change in quantity demand of } X}{\text{original demand of } X}}{\frac{\text{change in price of } Y}{\text{original price of } Y}}$$

The cross elasticity of demand for substitute goods is always +ve because the demand for one good increases when the price of substitute good increases. Ex— Tea   coffee
        $P_T\uparrow$ $D_C\uparrow$
                +ve

The cross elasticity of demand for complementary goods is -ve because as the price of one good increases the demand for 2nd good

decreases. Ex— Petrol   car
              $P_P\uparrow$ $D_C\downarrow$
                -ve

Methods of measuring elasticity of demand

1- Percentage method - It is the method of price elasticity of demand.

2- Total out lay method - price elasticity of demand can be measured by change in expenditure of the consumer on a commodity as the price of that changes. It means for measuring the price elasticity of demand. By this method it is necessary to know in one direction the total expenditure changes with the change in price of commodity.
a) If weight decrease or increase in price the total expenditure does not change then elasticity of demand is equal to 1 or unity.
b) If weight increase or decrease in price the total expenditure changes in opposite direction respectively, then elasticity of demand is greater than one or relatively elastic demand.
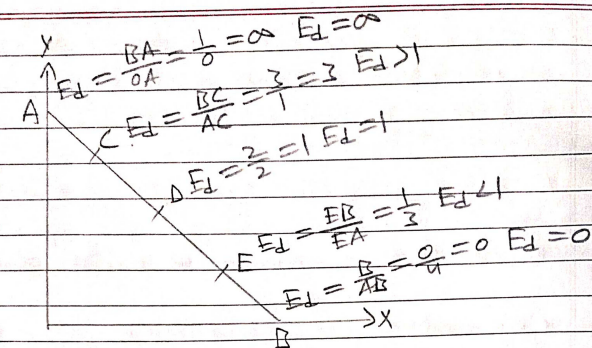c) When total expenditure increases or decreases with increase in price or decrease in price respectively in same direction then it is called relatively inelastic demand or $E_d < 1$.

Cases	Price	Q.D	T.E	Direction of change in T.E	Ed
1	4	3	12	constant	$E_d = 1$
	3	4	2	constant	$E_d = 1$
2	3	4	12	T.E↓ P↑	$E_d > 1$
	4	2	8		$E_d > 1$
	2	5	10	T.E↑ P↓	$E_d > 1$
3	3	2	6	T.E↑ P↑	$E_d < 1$
	4	3	12		$E_d < 1$
	2	2	4	T.E↓ P↓	$E_d < 1$

$E_d > 1$

$E_d = 1$

$E_d < 1$
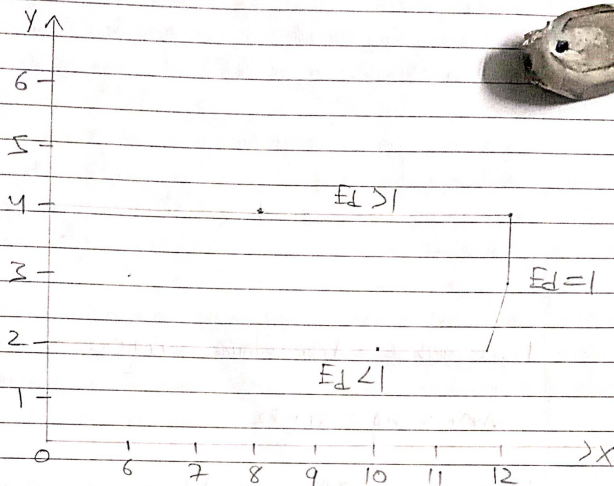
3 — Point method or geometric method — In this method we can measure the elasticity of demand at a point on a demand curve assuming demand curve is a straight line. We pick up a point on the same demand curve by introducing a small change in price, we can geometrically derived the price elasticity of demand. In case of a straight line demand curve, the elasticity of demand at a point is equal to the ratio of the lower segment of demand curve to the distance of its upper segment on demand curve. So, the formula is :-

$$E_d = \frac{\text{Lower segment on demand curve}}{\text{upper segment on demand curve}}$$

$E_d = \frac{BA}{0A} = \frac{1}{0} = \infty \quad E_d = \infty$

$E_d = \frac{BC}{AC} = \frac{3}{1} = 3 \quad E_d > 1$

$E_d = \frac{2}{2} = 1 \quad E_d = 1$

$E_d = \frac{EB}{EA} = \frac{1}{3} \quad E_d < 1$

$E_d = \frac{B}{AB} = \frac{0}{4} = 0 \quad E_d = 0$

4 — Arc method — Avg. of price $= \frac{P_1 + P_2}{2}$

Avg. of Q.D $= \frac{Q_1 + Q_2}{2}$

$$E_d = \frac{\dfrac{\text{Change in Q.D}}{\text{Avg. of Q.D}}}{\dfrac{\text{Change in Price}}{\text{Avg. of Price}}} = \frac{\dfrac{\Delta Q}{Q_1 + Q_2}}{\dfrac{\Delta P}{2}}$$

$$E_d = \frac{\Delta Q}{\Delta P} \times \frac{P_1 + P_2}{Q_1 + Q_2} = \frac{Q_1 - Q_2}{P_1 - P_2} \times \frac{P_1 + P_2}{Q_1 + Q_2}$$

Demand forecasting — We have already studied the concept of demand and its importance. Now we are in the position to define demand forecasting. It is a field of predictive, analytics which tries to understand and predict customer demand to optimize supplied discussion by corporate supply chain and business management. Demand forecasting methods are of 2 types :- qualitative and quantitive. It is required for planning the activities of the business firm. Now let us see the importance of demand forecasting through some points.

1— Distribution of resources— Inputs are processed to result in output.

This inputs include resources like material, machinery and human resource. The business firm take decision like capital arrangement, manpower planning etc. This means can be done easily with the help of demand forecasting.

2- Helps in avoiding wastage of resources - Demand forecasting will help in proper investigation where product stands in the market and how future demand will be predicted for the product, So in order to avoid wastage it is always beneficial to have a sence of future demand for product and services.

3- Serves as a direct and production - Producer needs to ensure that their is continues supply of goods and services in the market. If their is a proper prediction of the demand then it serves as a good instrument for business to undertake future activities.

4- Pricing - If there are sincere prediction about the future sale ~~of~~ of the product then it is helpful for devicing pricing stargy.

5- Decrease in business risk - Where there is business risk demand forecasting helps in reducing uncertainties and risk to certain extend.

6- Inventory management - It is one of the basic thing associated for future demand.

7- Helps in devicing self policy - Production is followed by sells. The business firm can plan its self policy effectively on the backdrop of demand forecasting. This implies the distribution of goods and services can be done on the basis of prediction of demand.

SUPPLY - Supply refers to the various quantities of a commodity offered for sale at different possible prices at a given time. Supply is a flow concept. Supply of a good depends on number of factors like price of a good, price of related goods, technique of production, factor prices, government policy etc. A change in any one or all of the factors can change the supply of the commodity. To study the effect of any one factor on the supply of the commodity, we keep the other factors constant.

Stock means the total quantity of commodities which a seller will keep in the godown to be sold in future.
Ex- 100 unit of X ₹50 each out of that 50 units of X is sold at ₹50 each. This is the supply and rest 50 units is ho arded to be sold in future.

Supply Schedule - Supply schedule refers to the list of quantities of a commodity offered for sale at different possible prices in a given time period.

Px	Q.Sx
10	100
20	200
30	300

Individual supply schedule - It is the list of quantities of a commodity offered for sale at different possible prices in a given time period by a single seller in the market.

Px	Q.S of X for 'A'
10	100
20	200
30	300

Market supply schedule - It refers to the list of quantities of a
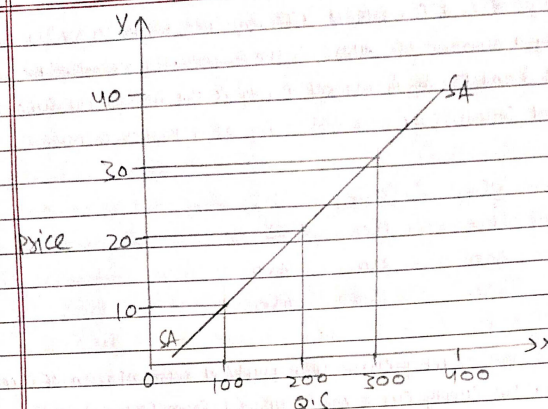
commodity offered for sale at different possible prices at a given time period by a number of sellers in the market. For example we have taken 2 sellers A and B. Again market supply is the horizontal submission of individual sellers, supply of commodity at a particular price.

Py	Q.SA	Q.SB	M.S
10	100	150	250
20	200	250	450
30	300	350	650

Supply curve — Supply curve is a graphical representation of supply schedule. The supply curve moves upward from left to right. Because of the direct relationship between supply of commodity and its price. Each point on the supply curve shows the combination of quantity supplied of a commodity and its corresponding price. The supply curve is denoted by SS.
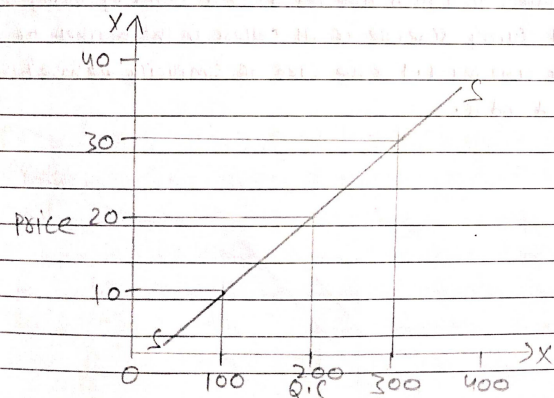
Individual supply curve — Individual supply curve is the graphical representation of individual supply schedule. It shows higher the price higher will be the quantity supplied of commodity. In a diagram the supplied curve is denoted by SA SA which moves upward from left to right.

Market supply curve — The market supply curve is a graphic representation of market supply schedule. It is the list of total quantity of a commodity offered for sale by all sellers in the market at different possible prices in a given time period. It is found by adding the individual supply schedule of all sellers in the market at a particular time period. For the sake of simplicity we have taken only 2 sellers A and B.
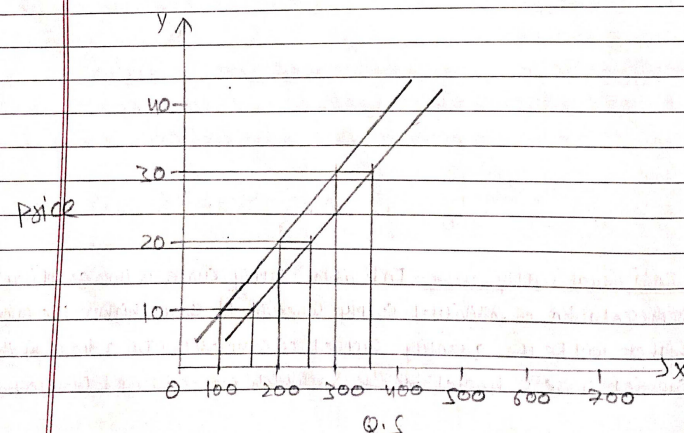
Law of supply

Law of Supply - The law of supply explains the relationship betn price and quantity supply where other things remaining constant when price of a commodity rises it supply rises and when price of a commodity falls supply falls.

Symbolically

Sx is directly related to Px $(Sx \alpha Px)$.
Sx is supply of X and Px is price of commodity of X.

Assumption

1 - The seller is a rational human being.
2 - Prices of related goods remains constant.
3 - Prices of factor of production should remain constant.
4 - The expectation of the producer and the government policy should remain constant.
5 - Natural factors like climatic condition and rainfall should remain normal.

Explanation of law of supply

Supply schedule - supply schedule refers to the list of quantities of a commodity offered for sale at different possible prices in a given time period.

Px	Q.Sy
10	100
20	200
30	300

Supply curve - supply curve is a graphical representation of supply schedule. The supply curve moves upward from left to right. Because of the direct relationship betn supply of commodity and its price. Each point on the supply curve shows the combination of quantity supplied of a

commodity and its corresponding price. The supply curve is denoted by SS.

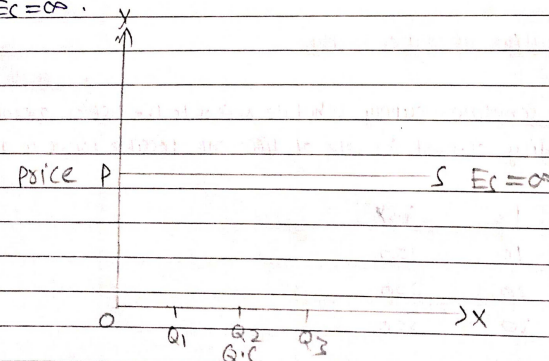| Px	Q.SA	Q.SB	M.S
10	100	150	250
20	200	250	450
30	300	350	650

Exception of the law

1 - Rare goods   2 - Labour supply   3 - Clearance sale
4 - Auction sale   5 - Need for cash   6 - Change in non-price determinant.

[5.12.2]

Types of elasticity of supply

1. Perfectly elastic supply - supply is said to be perfectly elastic when a very small change in price brings about infinite change in supply. $Ec = \infty$.


2. Perfectly inelastic supply $(Ec = 0)$ - A perfectly inelastic supply is one in which a change in price produces no change in quantity supply. The supply curve is parallel to y-axis.
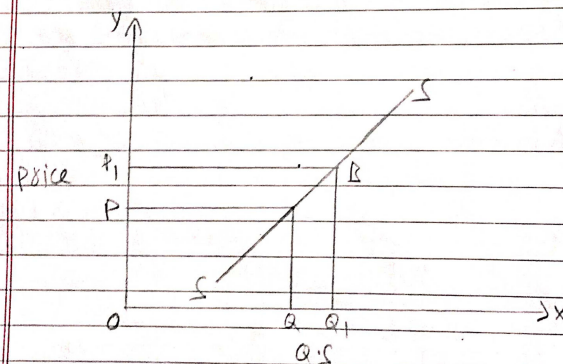
Price

O — Q — X
Q.S
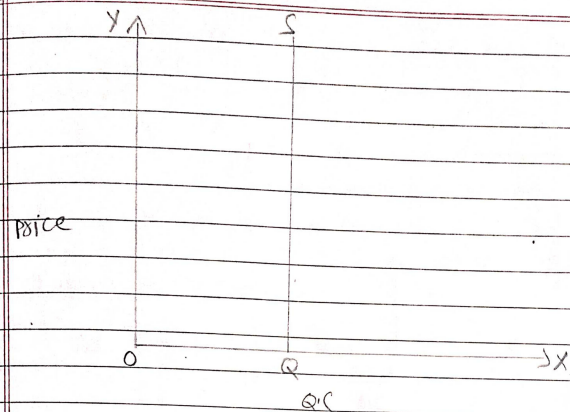
3. Unitary elastic supply (Ec=1) — In this situation a given change in price produces an equal and proportionate change in quantity supply. The distance bet^n PP₁ is equal to distance bet^n the supply QQ₁.
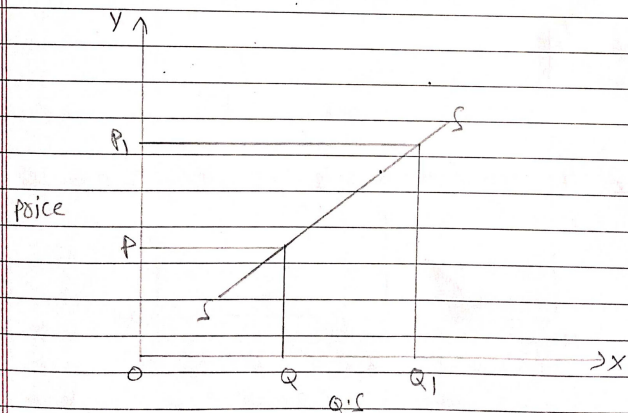
Price

4. Relativey elastic supply (Es >1) — In this case a small change in price brings about proportionately more change in quantity supply. The supply curve mover flatter upward. QQ₁ >PP₁
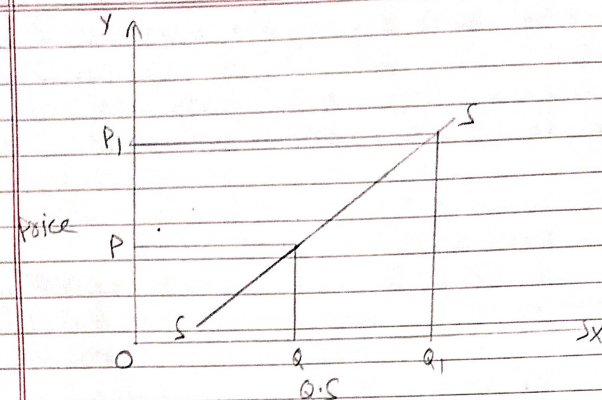
Price

5. Relatively inelastic supply (Es <1) — In this case the change in quantity supply is less than the proportionate change in price. The supply curve moves stepper upward. QQ₁<PP₁
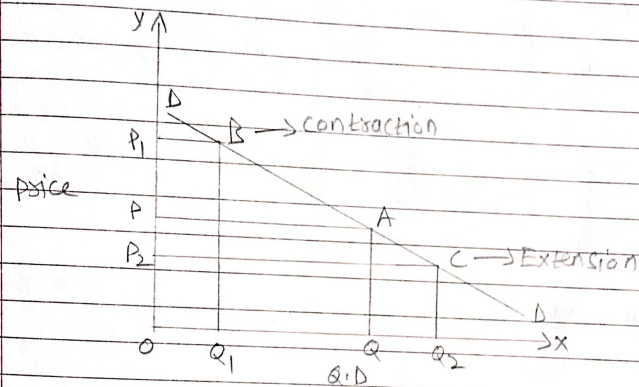

Price

$$Es = \frac{\text{Percentage change in Q.S}}{\text{Percentage change in Price}} = \frac{\frac{\text{change in Q.S}}{\text{original Q.S}}}{\frac{\text{Change in Price}}{\text{original Price}}}$$
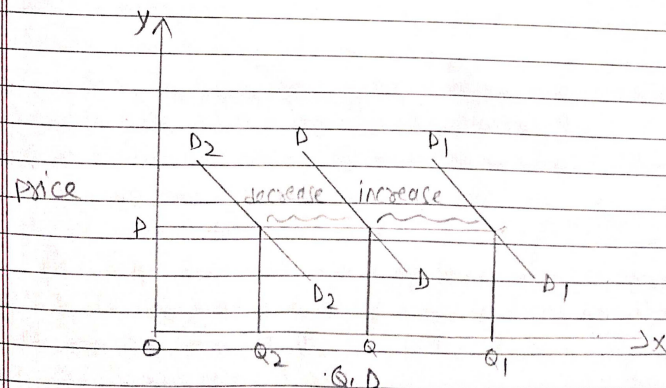
$$= \frac{\text{new Q.S} - \text{original Q.S}}{\text{original Q.S}}$$

$$\frac{\text{New Price} - \text{original price}}{\text{original price}}$$

$$\Rightarrow E_s = \frac{\frac{\Delta S}{S}}{\frac{\Delta P}{P}} \qquad \Rightarrow \boxed{E_s = \frac{\Delta S}{\Delta P} \times \frac{P}{S}}$$
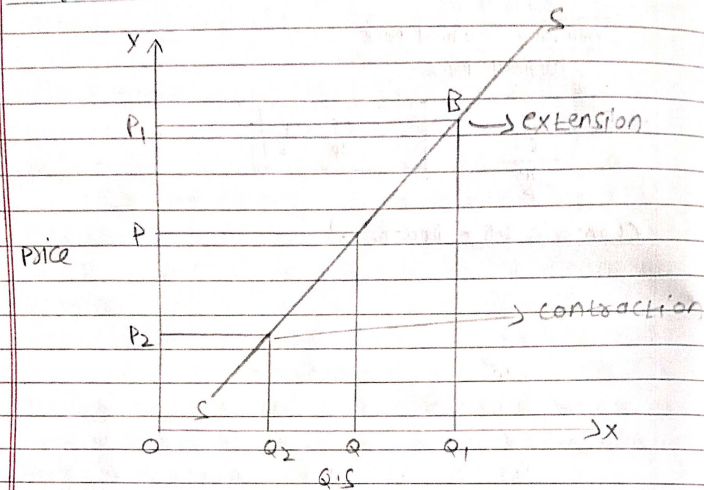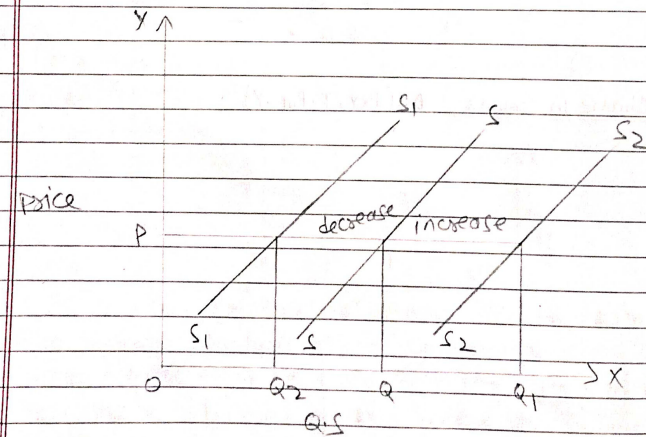
Change in Q.D — $D_x \propto \frac{1}{P_x}$

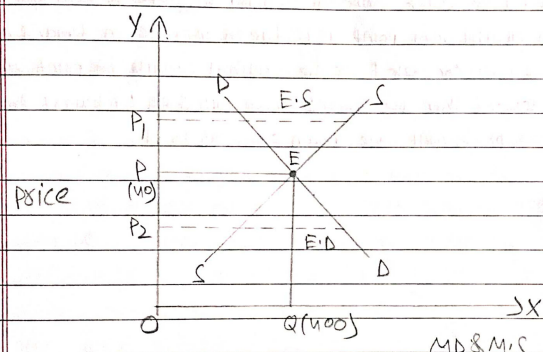Change in demand — $D \propto (P_{xy}, T, Pop, Y)$

Change in Q.S — $S \propto P_x$

Change in supply.

13

Market Equilibrium -

Price	M.D		M.S	
10	1000	>	100	
20	800	>	200	← excess demand
30	600	>	300	
40	400		400	← equilibrium price
50	300	<	600	
60	200	<	800	← excess supply
70	100	<	1000	

In a market both demand and supply place an important role in the determination of price of a commodity.

Equilibrium is the state of rest after which if there is a change in the price there will be a state of disequilibrium.

So equilibrium price is determined at the point of intersection of demand and supply. If the equilibrium price is 40 in the schedule then a disjoint market demand is equal to market supply at 400.

Now, if the price falls below the equilibrium price i.e, 30,20,10 then demand will be more than supply leading to excess demand and if the price increases from 40,50,60,70 then the supply will more than demand leading to excess supply.

Therefore, the equilibrium price is to determine in the market where market demand is equal to market supply.

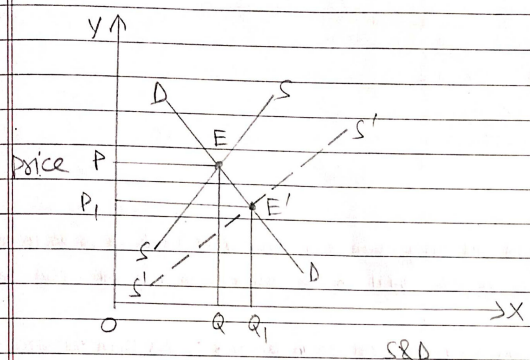1. Change in price due to change in demand keeping supply constant

Change in demand means either increase or decrease in demand, where the change is costed due to the influence of other factors on demand, other than price. There is change in the equilibrium price. SS and DD is the original supply and demand curve both intercept at point E, where equilibrium price OP and quantity OQ. With increase in demand the demand curve shift from DD to D'D'. The shift from OP to OP' and the new equilibrium point is E' due to increase in demand. If it this stage we will consider E' as the original equilibrium point and increase in demand then the demand curve will shift backward from D'D' to DD and the price will come down from OP₁ to OP.
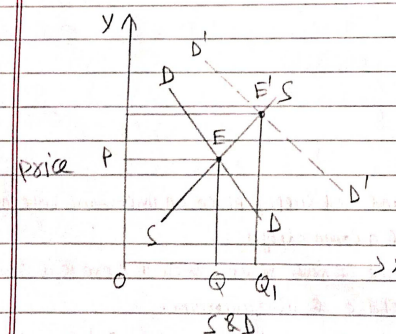
2. Change in price due to change in supply keeping demand constant

Change in supply means either increase or decrease in supply with demand remaining constant which result in change in price. The initial equilibrium point is E where original demand and supply intercept keeping demand constant if supply increases from SS to S'S' the price

is falls from OP to OP₁ with new equilibrium point is E' and quantity OQ₁. Now at this position if we take E' as the original equilibrium and decrease the supply then the supply curve shift to the left to SS keeping equilibrium point E and price will be OP₁


S&D

3. Change in price due to change in both demand and supply

If both the demand and supply change either increase or decrease then there will be change in equilibrium position. They may be change in shape, direction i.e, both may increase or decrease in same direction, secondly demand and supply may change in opposite direction i.e, one may be increase and other may fall and vice versa.

20.12.21

i) When demand and supply change in same direcn then their is no change in equilibrium price

In this case the original equilibrium occurs at point E with the intersection of original demand and supply curve with the increase in demand the demand curve shift to the right to D'D' and with the increase in supply the supply curve shift to the right to S'S'. The new equilibrium point is at E' with the intersection of D'D' and S'S'. So, the equilibrium price remains the same at OP.

D&S
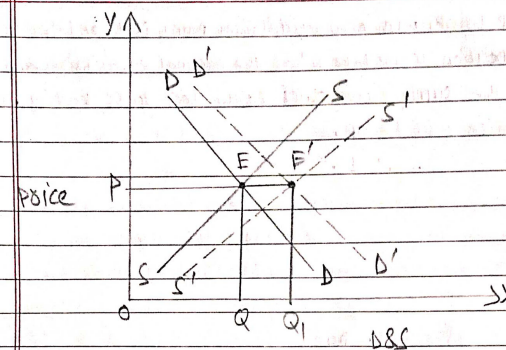
2. Both demand and supply change in same direcn and the proportionate change in one is not equal to the other, then only price change.

In the diagram when the increase in demand is less than increase in supply, then the new price falls down from the equilibrium price.

D&S
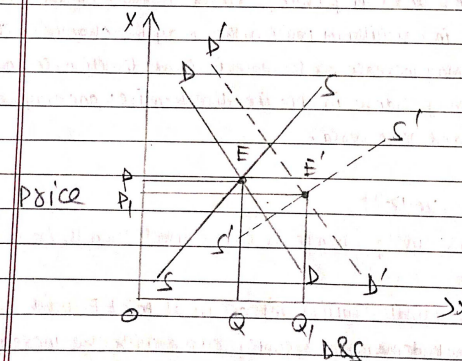
Increase in supply is less than increase in demand due to price change.

If the increase in supply is less than increase in demand then in that case the price will increase from the equilibrium price.
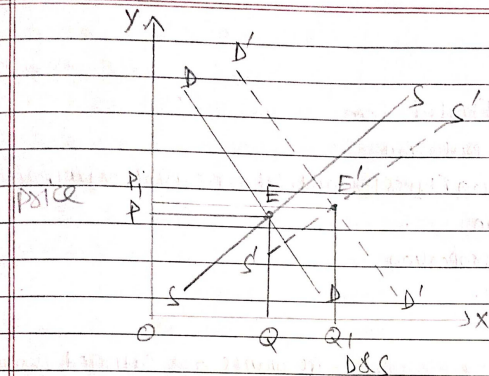
— X —

MODULE - 2

Production
— Def^n
— Production func^n [kinds]
— terms related to production
— Factors of production [types] — Land, labour, capital, organisation
— Laws of production
a) law of variable proportion
b) Returns to scale.

Consumption calls for production — As wants are satisfied through consumption of goods and services. Some of the goods are produced directly by nature while others are produced by efforts of human labour.
 Human beings required both material and non material goods to satisfy human wants.
 Material goods are visible, tangible and can be given a shape whereas nonmaterial goods are invisible, intangible and cannot be given a shape. We can just feel their existance, they have the capacity to satisfy human wants. Thus, production acts utility to the commodity production is any activity that results in goods and services intended for exchange.
 Production is nothing but physical transformation of inputs to outputs. Inputs are the things which are brought to the farm to be used in production process and output is the final product produced by the producer for sale.
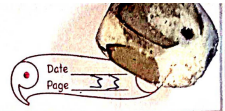
Production function — It shows the functional relationship between input and output.
$$X = f(\text{land, labour, capital, organisation})$$
output ↓   input

The producer tries to produce a given amount of output at minimum cost. Therefore, production function helps the producer how to get minimum or least cost factor for a given amount of output.

Production function is divided into shortrun production ___ func^n and longrun production func^n.

In the shortrun it is not possible to change all the factors of production to change the output of a farm. We can keep some factors constant and vary others to study its effect on output.

The functional relation that exists between input and output in the shortrun is called shortrun production func^n.

$$Y_0 = 4 \text{ labour}, 1 \text{ arc land}$$
$$Y_5 = 10 \text{ labour}, 1 \text{ arc land}$$

Longrun is an operational time period in which the output of a farm can be varied by change in all the factors. The functional relation that exists bet^n input and output in the longrun is called longrun production func^n.

$$Y_{0x} = 5 \text{ labour}, 6 \text{ capital}$$
$$Y_{5x} = 6 \text{ labour}, 10 \text{ capital}$$

Fixed Factor — Fixed factor exists only in the shortrun. It is independent of output in the shortrun. Factories, machinery, land are example of fixed factor. It exists even if the output is 0.

Variable factor — Variable factor exists both in the shortrun and longrun. It changes with the change in output in the shortrun. Labour, raw materials, etc. are examples of variable factors. When output is 0 quantities of variable factors are reduced to 0.

Laws of return

1- Law of increase in return — According to the law of increase in income at a particular stage of production increase in amount of input or factors of production brings proportionately more output leading to increase in return.
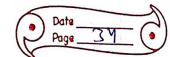
2- Law of deminising return — This occurs in the stage of production where increase in the variable factor with the fixed factor. The total return increases at a deminising rate.

3- Law of constant return — In this case combination of inputs produce equal amount of output.

Law of variable proportion

Total Product — It may be defined as the amount of aggregate output produce per unit of time by all factor inputs. In the shortrun total product increase with the increase in variable factor like labour and raw material.

$$TP = f(v)$$

Average product — It refers to the output per unit of a given variable factor. We obtain this by dividing the total product by the quantity of variable factor.

$$AP = \frac{TP}{No. \text{ of variable input}}$$

Marginal product — It may be defined as the addition made to the total product by employing one more unit of variable factor. For example other factor inputs remaining constant.

$$MP_n = TP_n - TP_{n-1}$$

By employing 10 labours in 1 hector land total product is 100. If the employee 11 units of labour on 1 hector land we produce 105 units of output or total product. So the addition make to be total product by extra 1 unit of labour is 105-100=5.

Laws of variable proportion — Law of variable proportion is a shortrun production func^n where an equal increment of a variable

factor in combination with a fixed factor will bring about increase in output at an increase in rate, constant rate and deminising rate. As we increase the quantity of any one input which is combine with the fixed quantity of other input. The marginal physical productivity of the variable input match eventually decline.

ASSUMPTION - 1. The technique of production is given or remain constant.
2. The units of variable factor are homogeneous i.e. equal in efficiency.
3. There are some inputs whose quantities are held constant.
4. It is possible to vary the proportion in which the various factor can be combined to produce a product.
5. The law assumes a chortrun.

units of fixed factor	variable factor (Lb)	TP	AP	MP	
1	1	10	10	10	} increasing M.P implies
1	2	25	12.5	15	increasing return to a
1	3	45	15	20	factor
1	4	60	15	15	
1	5	72	12.4	12	} Diminising M.P implies
1	6	78	13	6	diminising return to a
1	7	80	11.4	2	factor
1	8	80	10	0	} negative return to a
1	9	78	8.7	-2	factor

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In the above table the quantity of fixed factor (land) remains constant at 1 hector. Labour is variable factor as variable factor goes on increasing the production of output passes through 3 different stages. As labour employed in 1 hector of land goes on increasing, total product increases at an increasing rate the marginal product rises. This stage is called increase in return to a factor.
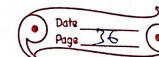
In the 2nd stage total output increases at a deminising rate, the marginal product falls. This is the stage of deminising return to a factor. This stage is important to the producer.
In the 3rd stage the marginal product is negative. This is called the stage of negative returns to a factor the total product falls.
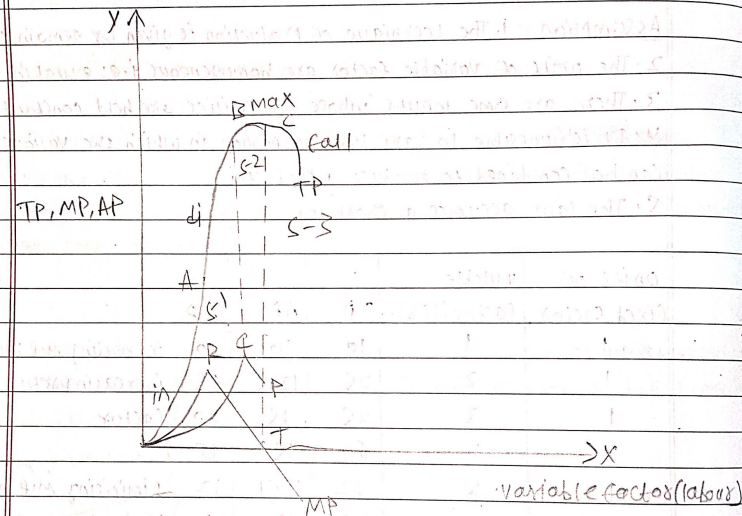
Causes of increasing return to a factor
1 - Fuller utilisation of fixed factor.
2 - Division of labour at increase in the efficiency of labour.
3 - Better coordination bet^n factors.

Causes of deminising return
1 - Fixity of factor.
2 - Imperfect factor cubstitutability.
3 - Poor coordination.

Labour	Capital	X (output)
A	1	12	20
B	2	8	20
C	3	6	20
D	4	3	20

IQ (20)
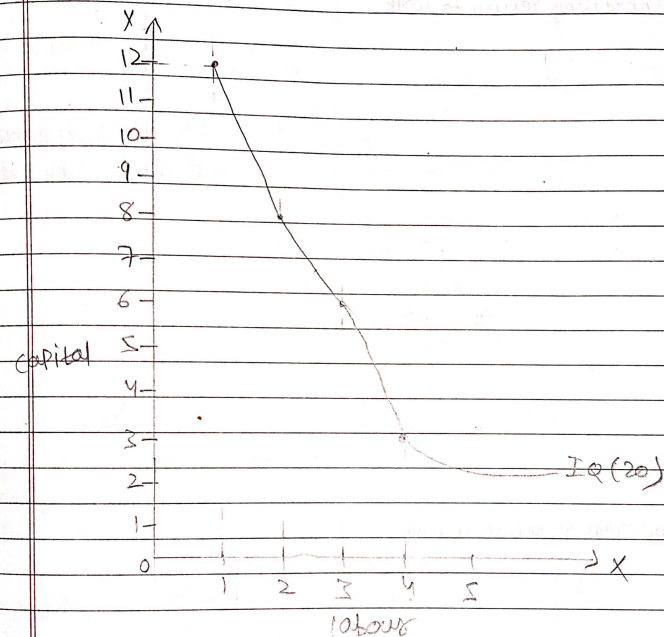
ISOQUANT — Isoquant are all those input combination which are capable of producing the same level of output. The isoquant are thus contour lines which shows the locus of equal output. The producer would be indifferent between them.

Marginal rate of technical substitution — This is defined as the number of units of capital which can be replaced by 1 unit of labour. The level of output remains unchanged.

Isoquant map — It shows a group of isoquants drawn together on a single map, showing increase in return, decrease in return and constant return.

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Increasing return to scale

$OA > AB > BC$ (distance bet^n the isoquant decreases)

Decreasing return to scale

$OA < AB$
$AB < BC$
distance bet^n isoquant increases
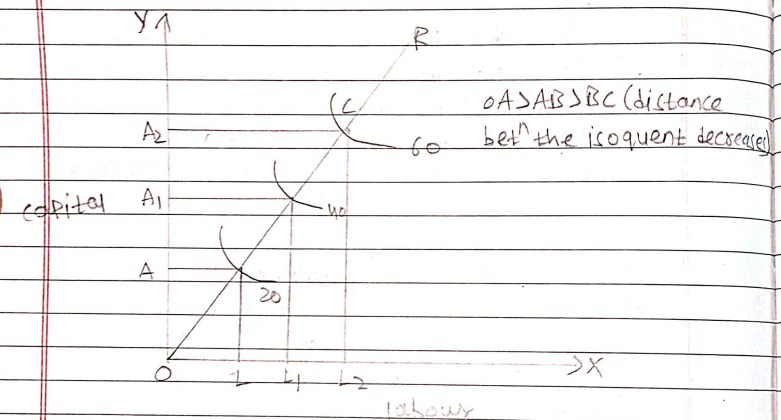
Constant return to scale

OA = AB = BC

distance betⁿ isoquent is same.

Single long run production function graph

Cost and Revenue

- Terms related to cost → money cost, Real cost, opportunity cost
- Fixed cost and variable cost
- Cost funcⁿ
- Shortrun cost
- Longrun cost

Production is not possible without cost of production. Some people calculate in terms of remunaration or income which we give to be factors of production and others in terms of sacrifices. So, cost can be analysed with the help of money cost of production, real cost of production and opportunity cost of production.

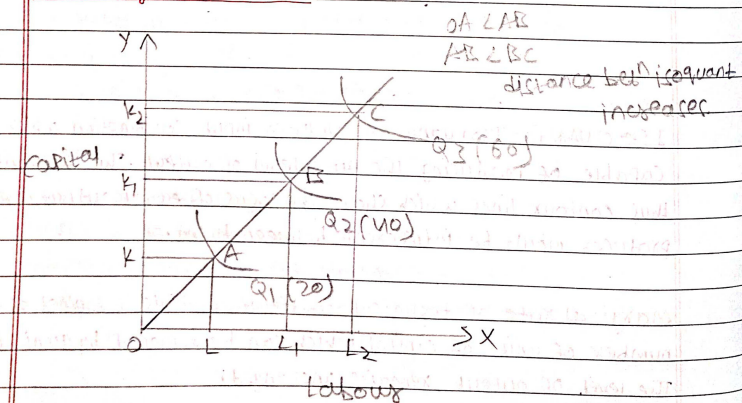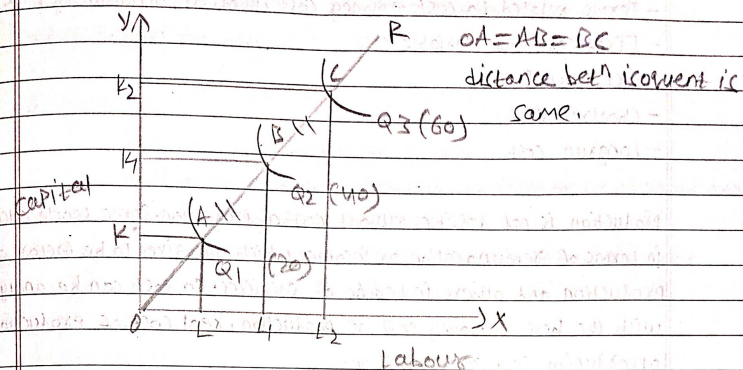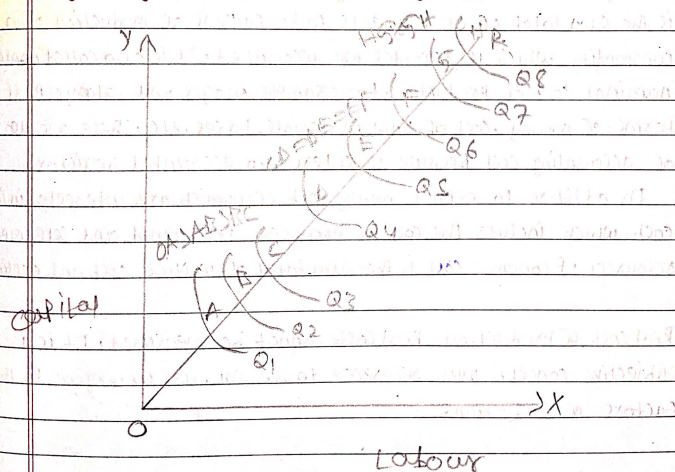Money cost of Production — Money cost of production for a certain output is the sum total of all payments to be factors of production of a commodity which is recorded or accounted. It is also called nominal cost of production. For example, wages and salarys paid in terms of money, cost of raw materials, taxes, etc. These are also known as accounting cost because it enters into accounted register.

In addition to explict money cost economist are interested in implict cost which includes the cost of producers selfowned and selfemployed resources. Economic cost is the sum total of implict cost and explict cost.

Real cost of Production — Real cost cannot be measured. It is a subjective concept with reference to the sacrifies undergone by the factors of production.

Opportunity cost of Production — Opportunity cost is otherwise known as alternative cost. It occupies very important place in economic analysis. It includes the opportunity cost of any good is the next best alternative good i.e. sacrificed.

These is based on 2 fundamental assumptions:-

1- Productive resources are limited 2- Resources have alternative uses. Therefore, if we produce one commodity we donot produce the other ar the resources are limited.

Fixed cost
1- These cost are found only in the shortrun.
2- These include the expenditure make to the fixed factor of production.
3- These cost are independent of output.
4- These cost are also called overhead cost or supplementary cost.
5- These cost exist at zero level output.

Variable cost
1- These cost are found in shortrun and longrun.
2- These are the expenditure made for the use of variable factors of production.
3- These cost change with the output.
4- These are also called prime cost.
5- These cost are zero at zero level of output.

cost function
$$c = f(Q, T, PF)$$
Q = Quantity of production
T = Technology
PF = Prices of factors used

It shows the relationship between cost of production and output. It shows the importance to choose least cost, combination of factors for production.

Short Run cost
Total cost = Total fixed cost + Total variable cost
$$TC = TFC + TVC$$

TFC, TVC & TC in short period table

units of output	TFC	TVC	TC	
0	100	—	100	
1	100	50	150	
2	100	90	190	
3	100	120	220	
4	100	140	240	
5	100	175	275	
6	100	230	330	
7	100	310	410	
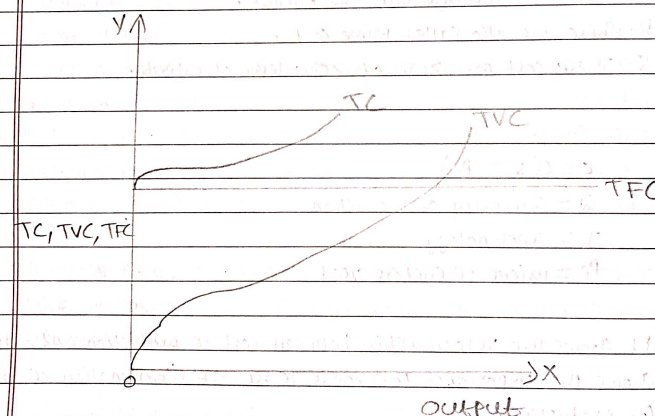
The whole of expenditure made by the farm to produce a given output in the shortrun is called shortrun cost. In short period total cost of production is divided into fixed cost and variable cost. In order to carry on production in the shortrun the farm must covered the

variable cost. If price of the product falls below variable cost then the farm will be closed down. In the longrun however, all cost must be covered failing which the farm will quit... in the industry.

In the diagram and table shown above the total fixed cost is the straight line parallel to x-axis shows that it remains constant at 100 whatever is the output. The curve TVC represents total variable cost which rises as output expands. It is 0 when no output is produce.

The curve TC represents total cost which is the vertical sumission of TFC and. TVC.

Average cost

$$\frac{TC}{output\ produced}, AC = AFC + AVC$$

$$\frac{TFC}{output\ produced} + \frac{TVC}{output\ produced}$$

Marginal cost

$$TC_n - TC_{n-1} \text{ or } \frac{\Delta TC}{\Delta Q}$$

Shortrun cost schedule including TC, TFC, TVC, AC, AFC, AVC, MC.

units of output	TFC	AFC	TVC	AVC	AC	TC	MC
0	100	0	—	—	0	100	—
1	100	100	50	50	150	150	50
2	100	50	90	45	95	190	40
3	100	33.3	120	40	73.3	220	30
4	100	25	140	35	60	240	20
5	100	20	175	35	55	275	35
6	100	16.66	230	38.33	55	330	55
7	100	14.28	310	44.28	58.5	410	80
8	100	12.5	400	50	62.5	500	90
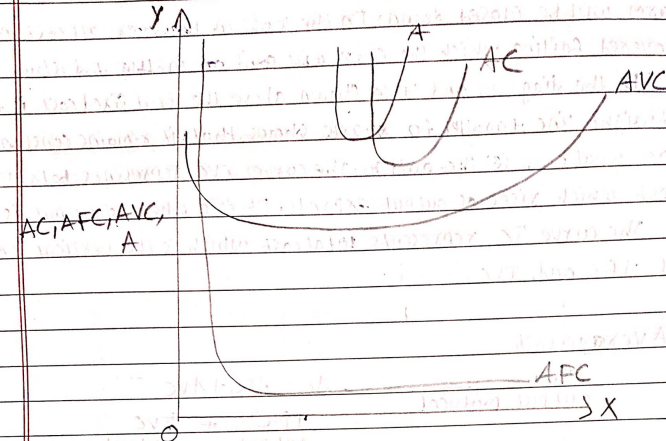
In the diagram AFC represents Average fixed cost curve which slopes downward to the right. AVC represents average variable cost which 1st falls and then rises. The curve AC represents average cost which is 'U' shaped. The curve MC represents marginal cost.

Relationship between AC and MC

1. When MC is less than AC the average cost falls.
2. When MC is equal to AC, average cost remains constant and becomes minimum.
3. When MC is greater than average cost, then the average cost rises.
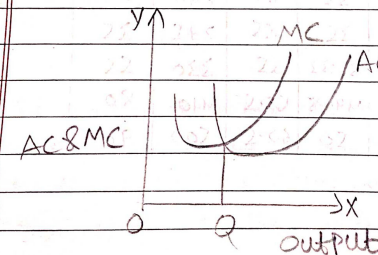
Longrun cost function
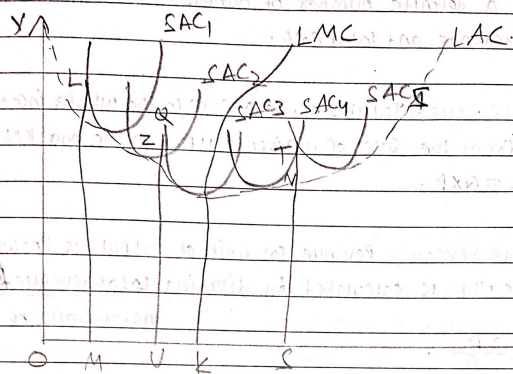
In the longrun cost curve there are series of shortrun cost curves. The producer aims at producing the output at the falling portion of shortrun cost curve till it reaches the minimum point on the shortrun cost curve. OM level of output is produced at point 1 at the falling portion of SAC_1. Again OU amount of output can be produced at 2 points Q and Z. Q lies on falling portion of SAC_2 and Z lies on rising portion of SAC_2. Therefore, it is potable to produce at point Q on SAC_2.

O K amount of output is produce at the minimum point of SAC_3. Again OS amount of output will be produced either at point P or N for a T lies on falling portion of SAC_5 and point N on rising portion of SAC_4. Therefore it is potable to produce OS level of output at the falling portion of SAC_5 showing fall in the cost.

We draw the tangency to the minimum points of all the shortrun AC curve we get the longrun AC curve. And longrun MC passes through the minimum point of longrun MC.

Revenue - Revenue refers to the income earned by the producer by selling a definite number of output. Profit is the difference between total revenue and total cost.

Total revenue - Total revenue refers to the whole income earned by the firm from the sale of a given output in the market.
$$TR = Q \times P$$

Average revenue - Revenue for unit of output is known as average revenue. It is calculated by dividing $\frac{total\ revenue}{no.\ of\ units\ of\ output\ sold}$

$$AR = \frac{TR}{Q}$$

Marginal revenue - Marginal revenue is the addition made to the total revenue by selling and additional unit of the product.
$$MR = TR_n - TR_{n-1}$$

Revenue under perfect competition
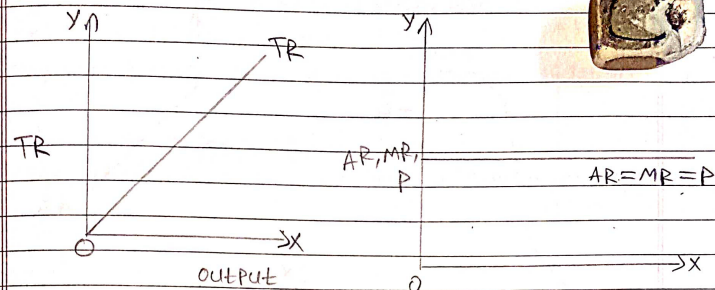
In such a market the firm as no control over the price prevailing in the market. It has to sale the product in the market determine price.

| NO. OF units sold	AR or P	TR = P×Q	MR	
1	10	10	10	
2	10	20	10	AR=MR=P
3	10	30	10	TR increases
4	10	40	10	
5	10	50	10	
6	10	60	10	
7	10	70	10	

In this form of market price is equal to average revenue is equal to marginal revenue and total revenue goes on increasing throughout. Total revenue is 45' lying to x-axis and average revenue, marginal revenue, Price go inside, the line is parallel to x-axis.

Revenue analysis in imperfect competition market

The price of the product is different. The average revenue or price is greater than marginal revenue and when marginal revenue is 0 total revenue is maximum and when marginal revenue is negative total revenue starts falling.

Marginal revenue can be negative ∴ or positive but average revenue is always positive.

No. of units sold	AR or P	TR = P×Q	MR
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	-2
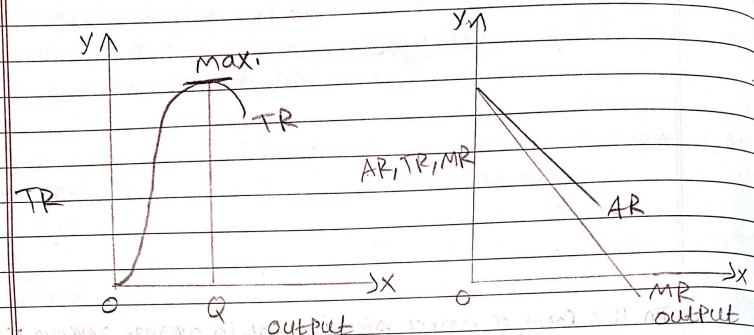
11.1.22

Isocost line – The prices of factors as represented by the isoquant lines. The isocost line plays an important part in determining what combination of factors the firm will choose for production.

An isocost line shows various combination of 2 factors that the firm can buy with the given amount of money to spent. In the diagram we are taken a labour hour on x-axis and machine hour or capital on y-axis.

They assume that prices of factors are given at constant for the firm. Now suppose the firm spents ₹300 on labour and capital and price of labour ₹4 for labour hour and price of capital is ₹5 for machine hour with outlay of ₹300 he can buy 75 units of labour or 60 units of machine hour i.e; capital. If we join 60 on y axis and 75 on x-axis we get the line AB which is the isocost line. Thus an isocost line is defined as the locus of various combination of factors which a firm can buy with a constant outlay. The isocost line is called the price line or outlay line.

RS 300 → Total outley or Total expenditure

price of per labour hour = ₹4

only labour max. we can use = $\frac{300}{4}$ = 75 units of labour hour

price of capital hour = ₹5

only capital use = $\frac{300}{5}$ = 60 units of capital hour used.
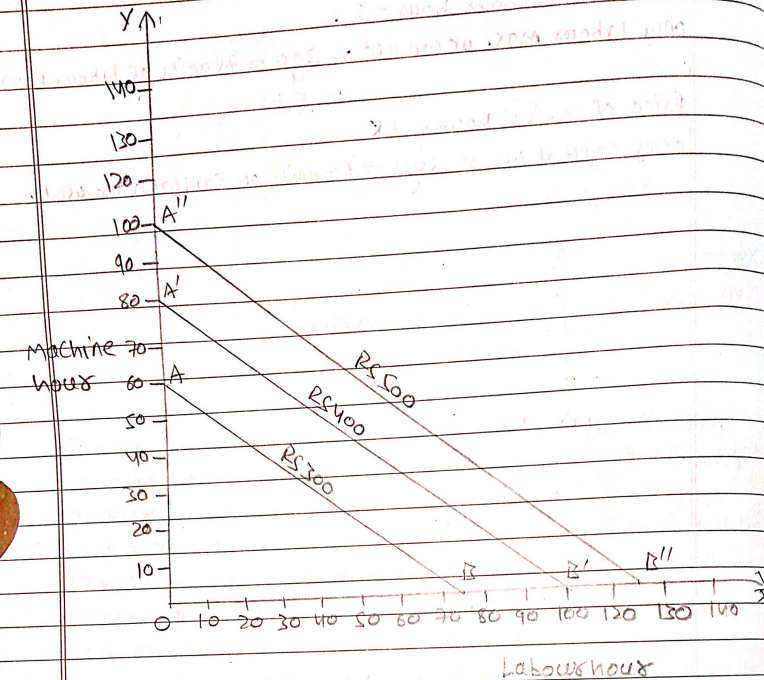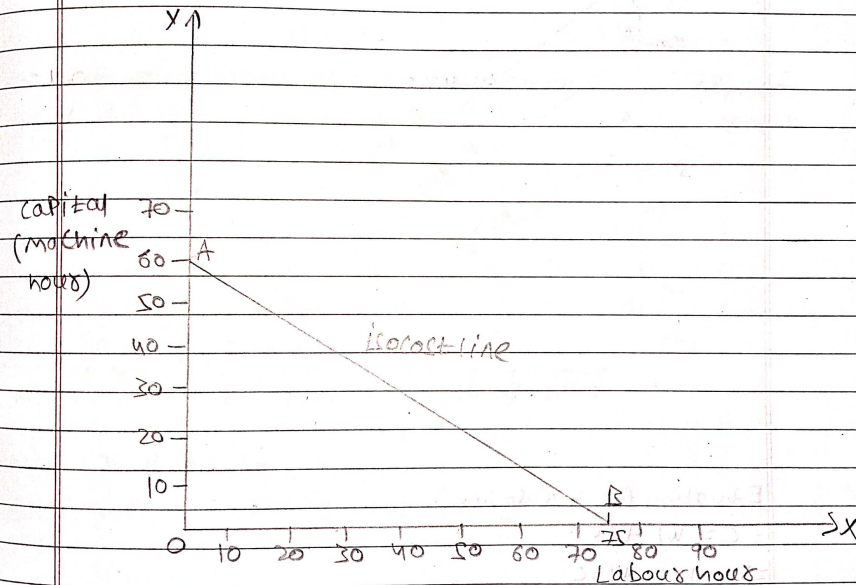
Equation for isocost line

$$C = WL + rK$$
$$\Rightarrow -rK = WL - C$$
$$\Rightarrow -rK = -C + WL$$
$$\Rightarrow rK = C - WL$$
$$\Rightarrow K = \frac{C}{r} - \frac{W}{r}L$$

$\frac{C}{r}$ → intercept , $\frac{W}{r}$ → factor price ratio is the scope of isocost line ∴

Total outlay = 300 , W = ₹4 , r = ₹5

$\frac{300}{4} = 75$ labour , $\frac{300}{5} = 60$ machine
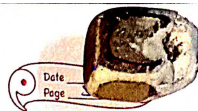
Total outlay = 400, $W = \frac{400}{4} = 100$, $r = \frac{400}{5} = 80$ machine
labour

Total outlay = 500, $W = \frac{500}{4} = 125$, $r = \frac{500}{5} = 100$ machine
labour

The isocost line will shift upward to the right when we increase the outlay.

13.1.22

Cost Minimisation and output maximisation
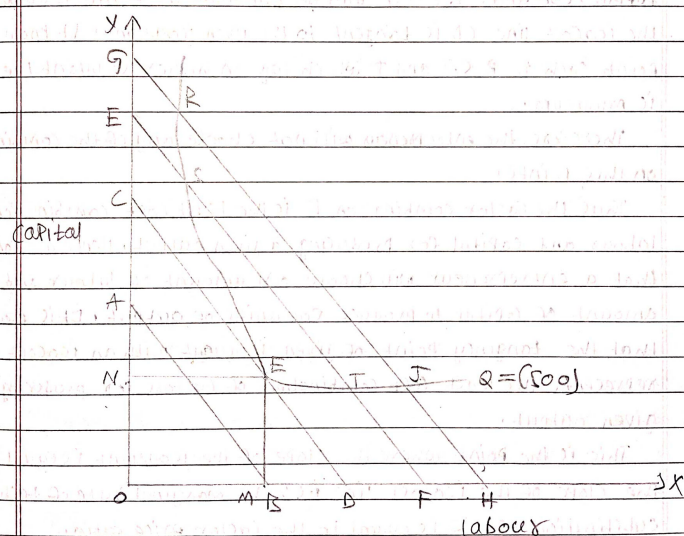
An equal product map represents the technical condition of production for a product. On the other hand, a family of isocost line represents the technical condition of production to a product. The entrepreneur may designer to maximisation his output level for a given cost or outlay. The producer has decided about the level of output to be produced. How the question is with which factor of combination the

entrepreneur will choose the combination of factors which minimisation the cost of production. For only in this way he will be maximize his profit.

Thus a producer will try to produce a given level of output with least cost combination of factors.

Suppose the entrepreneur has decided to produced 500 units of output which is represented by isoquant Q. This output can be produced by any combination of labour and capital R, S, E, T, J line on the isoquant.

We can see from the diagram for producing the given level of output 500 units the cost will be minimum at point E at which the isocost line CD is tangent to the given isoquant. At know other point such as R, S, T and J which lay on higher isoquant, the cost is minimum.

Therefore, the entrepreneur will not choose any of the combination on this points.

Thus the factor combination E is the least cost combination of labour and capital for producing a given output. Hence we conclude that a entrepreneur will choose OM amount of labour and ON amount of capital to produce 500 units of output. It is proved that the tangency point of given isoquant with an isocost line represents the least cost combination of factors for producing the given output.

This is the point where the slope of the isoquant is equal to the slope of the isocost line i.e., the marginal rate of technical substitution of LK is equal to the factor price ratio.

$$MRTS_{LK} = \frac{PL}{PK}$$

$$MRTS_{LK} = \frac{W}{r}$$

$$TC = Q \cdot W, \quad AC = \frac{TC}{Q}, \quad MC = TC_n - TC_{n-1}$$

Algebric form

$$TC = f(Q), \quad MC = \frac{d}{dQ}(TC), \quad AC = \frac{TC}{Q}$$

$$TC = a + bQ + cQ^2 + dQ^3$$

$$TC = TFC + TVC$$

$$TC = a + bQ + cQ^2 + dQ^3$$

$$MC = \frac{d}{dQ}(TC) = \frac{d}{dQ}(a + bQ + cQ^2 + dQ^3) = b + 2QC + 3Q^2 d.$$

$$AC = \frac{TC}{Q} = \frac{a + bQ + cQ^2 + dQ^3}{Q} = \frac{a}{Q} + b + CQ + dQ^2.$$

$$TC = a + bQ + cQ^2$$

$$MC = \frac{d}{dQ}(TC) = b + 2QC$$

$$AC = \frac{TC}{Q} = \frac{a}{Q} + b + CQ$$

Output at which marginal cost is minimum

To find out the output at which MC is minimum we have to search the 1st derivative of MC func^n is equal to zero.

$$MC = 200 - 18Q - 0.75 Q^2 = -18 - 1.5Q$$

$$Q = 18 \times \frac{10}{15} = 12.$$

Q. $P = 50,000 - 4Q$

i) MR ii) At what price and quantity of MR = 0 iii) TR is maximize

(Ans) $TR = f(Q)$

$TR = PQ$

$MR = \frac{d}{dQ} TR$

$$TR = PQ = (50000 - 4Q)Q = 50000Q - 4Q^2$$

i) $MR = \frac{d}{dQ} TR = \frac{d}{dQ}(50000Q - 4Q^2) = 50000 - 8Q$

ii) $50000 - 8Q = 0$

$\Rightarrow -8Q = -50000 \Rightarrow Q = 6250$

Price $= 50000 - 4Q = 50000 - 4 \times 6250 = 25000.$

iii) $\frac{d}{dQ}(TR) = 0$

$$TR = PQ = (50000 - 4Q)Q = 50000Q - 4Q^2$$

$$\frac{d}{dQ}(50000Q - 4Q^2) = 50000 - 8Q$$

TR is maximiced at $50000 - 8Q = 0$

$\Rightarrow -8Q = -50000 \Rightarrow Q = 6250.$

Q. $Q = 150 - 10P$

i) TR ii) MR

(Ans) i) $TR = PQ$

$Q = 150 - 10P \Rightarrow 10P = 150 - Q \Rightarrow P = \frac{150}{10} - \frac{Q}{10} \Rightarrow 15 - \frac{Q}{10}$

$$\left[15 - \frac{Q}{10}\right]Q = 15Q - \frac{Q^2}{10}$$

TR is maximize.

$$\frac{d}{dQ}(TR) = 0 \Rightarrow \frac{d}{dQ}\left[15Q - \frac{Q^2}{10}\right] = 0$$
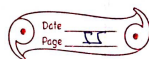
maximize

$\Rightarrow 15 - \dfrac{2Q}{10} = 0 \Rightarrow 15 - \dfrac{Q}{5} = 0 \Rightarrow \dfrac{Q}{5} = 15 \Rightarrow Q = 15 \times 5 = 75$

ii) $MR = \dfrac{d}{dQ}(TP)$

$= \dfrac{d}{dQ}\left[15Q - \dfrac{Q^2}{10}\right] = 15 - \dfrac{2Q}{10} = 15 - \dfrac{Q}{5}$

— X —

MODULE-3 MARKET

→ Definition
→ Different types of market (it characteristics)
→ Price determination in perfect competition
→ Break even analysis.

For general people market means buying and selling of commodities at a place where the market is named after the place. Thus a market consist of group of buyers and sellers in sufficiently closed contact with one another that exchange takes place among them.

Features
— commodity
— Buyers and sellers
— Communication betn buyers and sellers
— Price attachment
— Area

Types
There are 2 types of market
1. Perfect competition market   2. Imperfect competition market

Imperfect competition market are of 3 types:-
a) Monopoly   b) Monopolestic   c) Oligopoly.

In case of perfect competition market innumerable buyers and sellers having full knowledge about the market substitution compact among themselves for an identical product, so that price prevails in the market. The relatives strength of both buyers and sellers in the market are equal. Individually all accepts the prevailing price in the market. Thus perfect competition refers to the market competition as same price for same thing prevails all over the market.

Features of Perfect Competition

1. Large number of buyers and sellers.
2. Homogeneous product.
3. Perfect knowledge.
4. Free entry and exit.
5. Perfect mobility of factors.
6. No transport cost.

a) **Monopoly market** - Monopoly refers to a market structure where a single firm industry is the sole producer and seller selling a commodity which donot have closed substitution in the market. In this case the price change of other products are no impact on the product. The seller is most powerful in the market.

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Features of Monopoly

1. Single seller.
2. Absence of closed substitutes.
3. Barrier to entry.
4. Advertising cost.
5. Price determination.
6. Demand curve is downward sloping.
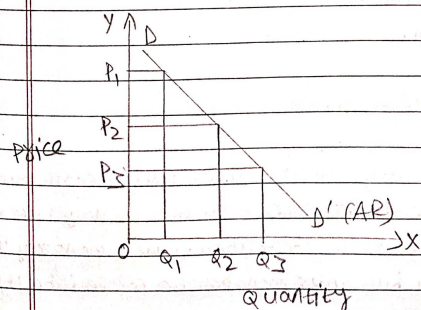
In the diagram DD is the market demand curve which slopes downward to the right. When price is OP_1 consumer demands OQ_1 output which is same as the monopoly seller selling OQ_1 output. If he reduces price to OP_2 he can sell OQ_2 output. This shows market demand curve of all buyers because the average revenue curve of the monopolist. The demand curve is relatively inelastic because of non availability of closed substitutes.

b) **Monopolistic** - Monopolistic competition as the name suggest is a market substitution where both monopoly and competative elements are present. Monopolistic competition is virtually same as perfect competition except in one respect. Under perfect competition all firms produce homogeneous products but under monopolistic competition firms produce differentiative products.

The product are differentiative through packaging, brands, colour, etc. Thus similar products are available under different brand names.

Features

1. Large number of buyers and sellers.
2. Product differentiation.
3. Free entry and exit of firms.
4. Independent price policy.
5. Importance of selling cost.
6. Non-price competition.

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c) **Oligopoly** - A market may operate either perfect competition or under imperfect competition. Imperfect competition may take the form of monopoly or monopolistic competition. Under monopoly there is no competition at all but under monopolistic competition there

exists stip competition among a large numbers of firms producing clothes substitutes. In between monopoly and monopolistic competition there is a third form of market known as oligopoly. Oligopoly means few sellers as the result the price output policy of one affects the others. Thus we can define oligopoly as a market structure where few sellers compete with each other and each controls a significant portion of market show that price output policy one affects the others.

Features of oligopoly
1. Few large sellers.
2. Large number of buyers.
3. Interdependence.
4. Importance of selling cost and advertising.
5. Competition.
6. Group behaviour.
7. Indefinite demand curve.

25.1.22

Break Even Analysis

$TR = TC \rightarrow$ Break even point

$TR > TC = $ Profit

$TR < TC = $ loss

We know that,

$TC = TFC + TVC$

$TR = P \times Q$

Break even point or quantity

$TR = TC$

$P \times Q_{BEP} = TFC + TVC$

$P \times Q_{BEP} = TFC + AVC \times Q_{BEP}$

$P \times Q_{BEP} - AVC \times Q_{BEP} = TFC$

$Q_{BEP}(P - AVC) = TFC$

$$Q_{BEP} = \frac{TFC}{P - AVC}$$

Break Even Analysis or it is also called profit contribution analysis is an important technique used to study the relationship beth the total cost, total revenue and total profit and losses over the whole range of stipulated output. It integrates the cost and revenue estimates to know the profits and losses associated with different level of output. Break Even Analysis basically is concerned with finding the point at which revenue and cost are equal.

The Break Even Point is therefore the volume of output at which either the profit is made nor a loss is incurred. In other words the Break Even Point is that level of sales volume at which there is neither profit nor loss. The main objective of Break Even Point is to find the cut off production volume from where a firm will make profit.

Break Even Point can be studied in different ways:-
1. Linear break even point   2. Non-linear break even point.

1. Linear break even point – The break even point B occurs at the intersection of total cost and revenue line. Break even point is that level of sales of production at which the sales revenue is exactly equal to total cost both variable and fixed cost. Break even point is that level of activity at which the firm neither earn selling profit nor suffers any loss. It is that point at which the contribution by a product just covers fixed cost. The vertical distance beth revenue line and the total cost line indicates a profit to the right of B and a loss to the left.

The angle of incidence is the angle beth sales and total cost line. This angle formed at the point of intersection of the sales and total cost line indicates the profit earning capacity and as such the wider the angle the greater is the profit and vice versa.

Break even Point

Break even
sales

Angle of incidence

profit

TR

TC

VC

TFC

FC

loss

Revenue
and
cost

b_0

output
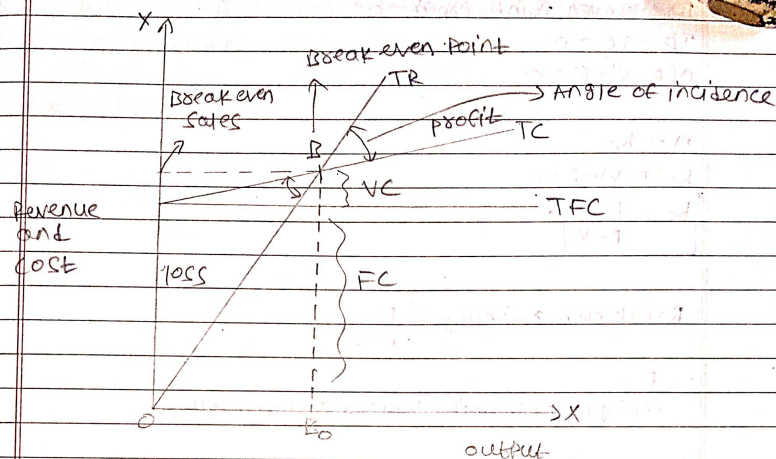
Notation

$n =$ number of units produced

$P =$ Selling price per unit

$C =$ total cost

$F =$ Fixed cost

$V =$ Variable cost

$Z =$ total profit / Gross profit

$Z' =$ net profit

$t =$ the rate of tax

$R =$ Sales revenue

$b_0 =$ Break even quantity.

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$R = n \cdot P$

$TC \text{ or } C = nV + F$

Gross profit $= TR - TC$

$= n \cdot P - (n \cdot V + F) = n \cdot P - n \cdot V - F = n(P - V) - F$

Break even point, profit $= 0$

$TR - TC = 0$

$n(P - V) - F = 0$

$n = b_0$

$b_0 (P - V) - F = 0$

$$b_0 = \frac{F}{P - V}$$

Break even quantity $= \dfrac{F}{P - V}$

$= \dfrac{FC}{\text{Selling price per unit} - \text{Variable cost per unit}}$

Break even sales $= \dfrac{FC \times \text{Selling price per unit}}{\text{Selling price per unit} - \text{Variable cost per unit}}$

$= \dfrac{F \times P}{P - V} = \dfrac{F \times P}{P - \frac{V}{P}} = \boxed{\dfrac{F \times P}{1 - V/P}}$

Margin of safety — Margin of safety is the sales over and above the Break even sales. The margin of safety indicates the strength of business. A high margin of safety may mean that the concerned will make profit even if they should be a fall in production or sale. A low margin indicates that fixed cost are high and profits cannot be made unless sales are increased to absorve the fixed cost or selling price is increased or cost are reduced or a more profitable product is substituted.

$MS = $ actual sales $-$ Break even sales $= \dfrac{\text{profit} \times \text{sales}}{\text{contribution}}$

where, contribution $=$ sales $- VC$

Contribution/unit = Selling price per unit − VC per unit

MS as % of sales = $\frac{MS}{sales} \times 100$

MS = $\frac{profit}{P/V\ ratio}$

P/V → Profit − Volume ratio

P/V = $\frac{sales - VC}{sales} \times 100$

MS = $\frac{profit + contribution}{sales}$

Relationship between BEP & P/V ratio

BEP (sales volume) = $\frac{FC}{P/V\ ratio}$

1. FC = ₹ 20,00,000
   VC/unit = ₹ 100
   Selling price/unit = ₹ 200

a) BE sales Quantity = $\frac{F}{P-V}$ = $\frac{20,00,000}{200-100}$ = 20,000 units

b) BE sales = $\frac{F \times P}{P-V}$ = $\frac{20,00,000 \times 200}{100}$ = ₹ 40,00,000

c) Find out the contribution and margin of safety if the actual production quantity is 60,000 units.

   Q = 60,000 units

   Contribution = Sales − VC

   P.Q − V.Q = Q(P−V) = 60,000(200−100) = 60,000 × 100
   = ₹ 60,00,000.

d) MS = Sales − BEsales = 200 × 60,000 − 40,00,000 = ₹ 80,00,000

e) Profit = contribution − FC = 60,00,000 − 20,00,000 = ₹ 40,00,000.

2. Calculate the BEP from the following information
   FC = ₹ 75,000, sales = ₹ 3 lakhs, direct material cost = ₹ 1 lakhs

direct labour = ₹ 60,000, direct expense = ₹ 40,000

(Ans) FC = ₹ 75,000, sales = ₹ 3,00,000
   Direct material cost = ₹ 1,00,000 ⎫
   Direct labour = ₹ 60,000   ⎬ VC
   Direct expense = ₹ 40,000   ⎭
                     ₹ 2,00,000

BEP (in sales) = $\frac{F \times P}{P-V}$ = $\frac{75,000 \times 3,00,000}{3,00,000 - 2,00,000}$

= $\frac{2250000000000}{1,00,000}$ = ₹ 2,25,000

Contribution = S − VC = 3,00,000 − 2,00,000 = 1,00,000
Profit = Contribution − FC = 1,00,000 − 75,000 = 25,000.

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Selling price per unit = ₹ 50
Variable cost per unit = ₹ 90
FC = ₹ 60,0000

a) If BEP is 8000 units
   So, what is the price

   BEQ = $\frac{F}{P-V}$

   ⟹ 8000 = $\frac{60,0000}{P-90}$ ⟹ (P−90)8000 = 60,0000

   ⟹ P−90 = $\frac{60,0000}{8000}$ ⟹ P−90 = 75 ⟹ P = 75 + 90 = 165.

b) sales required to earn profit ₹ 2,20,000
   = $\frac{FC + desired\ profit}{Contribution\ per\ unit}$ = $\frac{600000 + 220000}{150 - 90}$ = $\frac{622000}{60}$

   = 13667 units.

Q1) Direct labour is ₹ 150000

Direct Material is ₹ 410000

Variable over heads ₹ 200000

Fixed cost = ₹ 20000

Sales = ₹ 1000000

(Ans) a) $BES = \dfrac{F \times P}{P - V}$

V = Direct labour + Direct material + Variable Overhead

$= 150000 + 410000 + 200000 = 760000$

Contribution $= P - V = 10,00,000 - 7,60,000 = 2,40,000$

$BES = \dfrac{F \times P}{P - V} = \dfrac{1,20,000 \times 10,00,000}{2,40,000} = \dfrac{12,000,000,000}{2,40,000}$

$= 50000$

b) If an increase of 10% is there fixed cost.

New FC $= 120000 + \dfrac{10}{100} \times 1,20,000 = ₹ 1,32,000$

$BES = \dfrac{F \times P}{Contribution} = \dfrac{1,32,000 \times 10,00,000}{2,40,000} = 550000$

c) Increase in variable overhead by 10%.

New variable overhead $= 200000 + \dfrac{10}{100} \times 200000 = 220000$

Increase variable cost $= 760000 + 220000 = ₹ 780000$

$BES = \dfrac{120000 \times 1000000}{1000000 - 780000} = ₹ 545454.55$

2. Non-linear break even analysis:
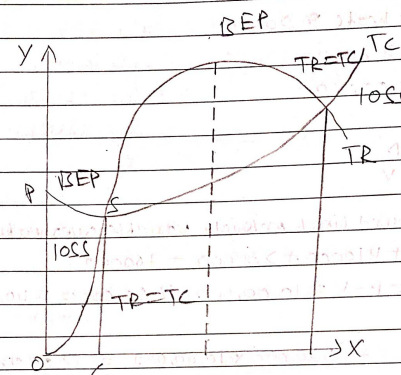
$R = F(Q)$

$C = F(Q)$

$BEP = R = C$

$BES = 'Q'$

$R = 100q - 4q^2$

$C = q^2 - 4q + 100$

BEP in quantity, $100 - 4q^2 - q^2 - 4q + 100$

$\Rightarrow 100q - 4q^2 - q^2 + 4q - 100 = 0$

$\Rightarrow -5q^2 + 104q - 100 = 0$

$\Rightarrow -[5q^2 - 104q + 100] = 0$

$\Rightarrow q = \dfrac{104 \pm \sqrt{(104)^2 - (4)(5)(100)}}{10}$

$\Rightarrow q = \dfrac{104 \pm \sqrt{10.816 - 2000}}{10}$

$\Rightarrow q = \dfrac{104 \pm 94}{10} \Rightarrow q = 19.8$

b) Break even sales or R

$R = 100 \times 19.8 - 4 \times (19.8)^2 = 1980 - 4 \times 392.04 = 1980 - 1568.16$
$= 411.96$

Conditions for Profit Maximisation

In order to find maximum profit we have to define the profit func^n π.

$\pi = R - C$.

The 1st order condition of profit maximisation is $\frac{d}{dQ}(\pi) = 0$.

2nd order condition is $\frac{d^2}{dq^2}(\pi) < 0$.

$R = 100q - 4q^2$

$C = q^2 - 4q + 100$

$\pi = R - C$

$\quad = 100q - 4q^2 - q^2 + 4q - 100$

$\quad = 104q - 5q^2 - 100$.

The 1st order condition is,

$\frac{d}{dQ}(\pi) = 0 \Rightarrow \frac{d}{dq}(104q - 5q^2 - 100) = 0$

$= 104 - 10q = 0 \Rightarrow q = \frac{104}{10} = 10.4$.

The 2nd order condition is,

$\frac{d}{dQ}(104 - 10q) < 0 = 0 - 10 = -10 < 0$.

So, the firm profit maximizing output

$q = 10.4$ units

max. $(\pi) = 100q - 5q^2 - 100 = 100 \times 10.4 - 5 \times (10.4)^2 - 100 = ₹440.80$.

$R = 100q - 4q^2$

$TR = P \times Q$

$P = \frac{TR}{Q} = \frac{100q - 4q^2}{q} = 100 - 4q$

$P = 100 - 4q$

$P = 100 - 4 \times 10.4 = ₹58.40$.

---

1. From the following information

Sales $= ₹20,000$

Variable cost $= ₹10,000$

Fixed cost $= ₹6000$

Find a) P/V ratio

     b) BEP

     c) MS

(Ans) P/V ratio $= \frac{Sales - VC}{Sales} \times 100 = \frac{20,000 - 10000}{20,000} = 50$.

$BEP = \frac{F}{P-V} = \frac{6000}{20,000 - 10,000} = \frac{6}{10} = 0.6$.

$MS = \frac{Profit \times Sales}{Contribution}$

$Profit = Contribution - FC$

$Contribution = P - V$.

$Contribution = P - V = 20,000 - 10,000 = 10,000$.

$Profit = Contribution - FC$

$\quad = 10,000 - 6000 = 4000$

$MS = \frac{Profit \times Sales}{Contribution} = \frac{4000 \times 20,000}{10000} = 8000$.

2. Sales $= ₹2,40,000$

     $FC = ₹50,000$

     $VC = ₹75,000$

Find a) Contribution b) Profit c) BEP d) MS

(Ans) a) $P - V = 2,40,000 - 75000 = 1,65,000$

b) $Contribution - FC = 1,65,000 - 50,000 = 1,15,000$

c) $BEP = \frac{F}{P-V} = \frac{5000}{1,65,000} = 0.030303030?$

34

d) $MC = \dfrac{Profit \times sales}{contribution} = \dfrac{1,15,000 \times 2,40,000}{1,65,000} = 167272.7272$.

8.2.22

Time value of money

- Simple interest and compound interest
- Different formulas for calculation of time value of money.
- Different project evaluations
- Depreciation.

The time value of money says the purchasing power of money at a particular period of time known as time value of money. A single rupee today a more valuable than a rupee a earn hence, there are several reason for this:

1. Individuals in general preformed current consumption to future consumption.

2. Capital can be employed productively to generate positive returns.

3. In an implementary period a rupee today represents a greater really purchasing power than a rupee in future.

4. Since money has earning as well as purchasing power money has time value.

Simple interest

$P = 1000$, $i = 10\%$, $n = 3$ years

$S.I = P \times I \times n$

1st year $= 1000 \times \dfrac{10}{100} \times 1 = 100$

2nd year $= 1000 \times \dfrac{10}{100} \times 1 = 100$

3rd year $= 1000 \times \dfrac{10}{100} \times 1 = 100$

Int. $= 300$

$F = P + I = 1000 + 300 = 1300$

$F = P + PIN = P(1 + In) = 1000\left(1 + \dfrac{10}{100} \times 3\right) = 1300$

Compound interest

$P = 1000$, $i = 10\%$, $n = 3$ years

1st year

$I = PIN = 1000 \times \dfrac{10}{100} \times 1 = 100$

2nd year

$P_2 = P + I = 1000 + 100 = 1100$

$I = 1100 \times \dfrac{10}{100} \times 1 = 110$

3rd year

$P_3 = P_2 + I_2 = 1100 + 110 = 1210$

$I = 1210 \times \dfrac{10}{100} \times 1 = 121$

Total C.I $= 100 + 110 + 121 = 331$

$F = P + I = 1000 + 331 = 1331$

$F = P(1 + i)^n = 1000\left(1 + \dfrac{10}{100}\right)^3 = 1331$

Notations

$P =$ principle amount

$i =$ rate of interest

$n =$ No. of years

$F =$ feature amount

$A =$ Anauity

$G =$ Linear Gradience series

$g =$ Geometric gradience series

$F =$ feature amount

we know, $F = P(1+i)^n$

monthly, $F = P(1+\frac{i}{12})^{12n}$

semiannually, $F = P(1+\frac{i}{2})^{2n}$

Daily $F = P(1+\frac{i}{365})^{365n}$

Effective interest $(i_{eff}) = \frac{F-P}{P}$

Cash flow diagram

inflow

x, i
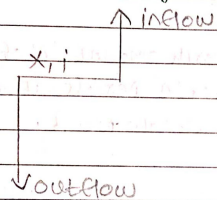
outflow

Cash flow diagram is an imaginary line they shows the cash inflow and outflow.

10.2.22

1. single payment compound amount factor

Obj :- The objective is to find to single future sum (F) of the initial payment (P) made at time '0' after 'n' periods at an rate of interest 'i' compound every period.

$F = 2$

$i = i_0, n$

$F = P(1+i)^n$
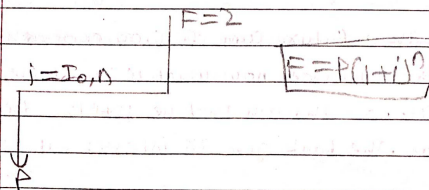
Suppose, initial payment $= 5,00,000$

$i = 11\%$, $n = 12$ yr.

$F = 5,00,000(1+\frac{11}{100})^{12} = 1749225.29$

Q. A person deposit a sum of 3,00,000 at an interest 8% compounded annually for 5yr. Find the maturity value after 5yr.?

Ans) $i = 8\%$, $n = 5$ yr, $P = 3,00,000$

$F = 3,00,000(1+\frac{8}{100})^5 = 440798.45$

2. single payment present worth factor

The objective is find the present worth amount 'P' of a single future 'F' which will be received after 'n' periods at an interest rate of compound at the every interest rate period.

$F = guess$

A, i

$P = \frac{F}{(1+i)^n}$

$P = 2$
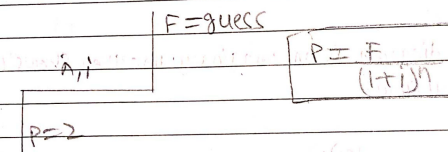
$F = 20,00,000$, $i = 12\%$, $n = 10$ yr.

$P = \frac{20,00,000}{(1+\frac{12}{100})^{10}} = 643946.47$.

Q. A person wishes to have a future sum of 5,00,000 for his son education in UK after 10 yr. from now what is the single payment that he show deposit now through that he gets the desire amount after 10 years. The bank give 7% interest rate, compounded annually.

Ans) $F = 5,00,000$, $i = 7\%$, $n = 10$ yr.

$$P = \frac{5,00,000}{\left(1+\frac{7}{100}\right)^{10}} = 254174.64$$

3. Equal payment series compound amount factor

The objective is to find the future worth of 'n' equal payments which are made at the end of every interest period till the end of nth interest period at an interest rate of 'i' compounded at the rate of each interest period.

$$F = A\left[\frac{(1+i)^n - 1}{i}\right]$$

$F = ?$

n yr, i
A A A
guess

A person paid 15000 to the bank at the every year till 15 years with rate of interest 12%. find the future amount he will get:-

$$F = 15000\left[\frac{\left(1+\frac{12}{100}\right)^{15} - 1}{\frac{12}{100}}\right] = 559195.71$$

Q. A person which planning for a retired life he plans to invest equal sum at rupee 10,000 at end of every 8 year for the next 25 year from the end of next year. The bank give 20% interest rate compounded annually. Find the value of maturity ~~annually. Find the value of~~ of the compound when he is 50 yr. old)

(Ans) $A = 10,000$, $n = 25$, $i = 20\%$, $F = ?$

$$F = 10,000\left[\frac{(1+0.20)^{25} - 1}{0.20}\right] = 4719810.832$$

4. Equal payment series sinking fund

$i = ?\%$

$$\begin{array}{c} 1 \quad 2 \quad n \\ A=? \quad A=? \end{array}$$

The objective is to find equivalent amount A that should be deposited at the end of every interest period for n interest period to realise future sum F at the end of nth interest period of i.

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$$A = F\left[\frac{i}{(1+i)^n + 1}\right]$$

$F = ₹4,00,000$, $i = 6\%$, $n = 10$ year.

$$A = 4,00,000\left[\frac{0.06}{(1+0.06)^{10} + 1}\right] = 8599.537$$

Q. A company has to replace a present facility after 15 years at an outlay of ₹5,00,000. He plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18% compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 15 years.

(Ans) $F = 5,00,000$, $i = 18\%$, $n = 15$

$$A = 5,00,000\left[\frac{0.18}{(1+0.18)^{15} + 1}\right] = 6937.08$$

5. Equal Payment Series Present Worth Factor

The objective here is to find the present word of an equal payment made at the end of every interest period for n at an interest rate of i compounded at the end of every interest period.

$$P = A \left[\frac{(1+i)^n - 1}{i(1+i)^n} \right]$$

$A = 1,00,000 \quad , i = 9\% \quad , n = 14$

$$P = 1,00,000 \left[\frac{(1+0.09)^{14} - 1}{0.09(1+0.09)^{14}} \right] = 778615.03885$$

Q. A company wants to set off a reserve which will help the company to have an annual equivalent amount to of employes ₹20,00,000 for the next 20 years towards its employs welfare measure. The reserve assume to grow at are rate of 10% annually. Find the single payment that must be paid now as the reserve amount.

(Ans) $A = ₹20,00,000, \; i = 10\% \; , \; n = 20$ years

$$P = 20,00,000 \left[\frac{(1+0.10)^{20} - 1}{0.10(1+0.10)^{20}} \right] = 17027127.439$$

6. Equal Payment Series capital recovery amount

The objective is to find the annual equivalent amount A which is to be recovered at the end of every interest period for n interest period for a loan P which is samsung now at an date of interest of i compounded at the end of every interest period.

$$A = P \left[\frac{i(1+i)^n}{(1+i)^n - 1} \right]$$

Q. A person has taken a loan of ₹20,00,000 from the bank and want to repay a loan in equal amount within 10 years interest rate of 11%. Find the value of A.

(Ans) $P = ₹20,00,000, \; n = 10$ years, $i = 11\%$.

$$A = 20,00,000 \left[\frac{0.11(1+0.11)^{10}}{(1+0.11)^{10} - 1} \right] = 339602.85$$

Q. The state bank of India gives a loan to a company to purchase a machine worth ₹5,00,000 at an interest rate of 12%. Compounded annually. This amounts should be repay in 10 yearly instalment. Find the instalment amount that the company should paid to the bank.

(Ans) $P = 5,00,000, \; i = 12\% \; , \; n = 10$ years

$$A = 5,00,000 \left[\frac{0.12(1+0.12)^{10}}{(1+0.12)^{10} - 1} \right] = 88492.08$$

12.2.22

Evaluation of Engineering projects

1. Present worth method — a) Identify cash inflows.
   b) calculate present worth inflows.
   c) calculate present worth outflows.
   d) Find out NPW (Net present worth)
   NPW = present worth inflow - present worth outflow.
   e) Compare NPW with 0
   If NPW > 0 accept the project

NPW $<$ 0   Reject the Project

NPW $=$ 0 (You may accept / reject the project).

EX-1

P $=$ 15,00,000 , F $=$ 30,00,000 , i $=$ 14% , n $=$ 10 years

F $=$ 30,00,000

i $=$ 14%, n $=$ 10

P $=$ 15,00,000
outflow

Present outflow (worth) $=$ 15,00,000

$$P = \frac{F}{(1+i)^n} = \frac{30,00,000}{(1+0.14)^{10}} = 809231.42 \ (PWI)$$

NPW $=$ PWI $-$ PWO $=$ 809231.42 $-$ 15,00,000 $= -690768.58$

NPW $<$ 0 [Reject].

EX-2

A $=$ 25,000 , $F_1 =$ 2,00,000 , $F_2 =$ 2,00,000 , $X_1 =$ 4 year,

$X_2 =$ 10 year , i $=$ 9%

$F_1 =$ 2,00,000 $F_2 =$ 2,00,000

i $=$ 9%

0 1 2 3 4 5 6 7 8 9 10
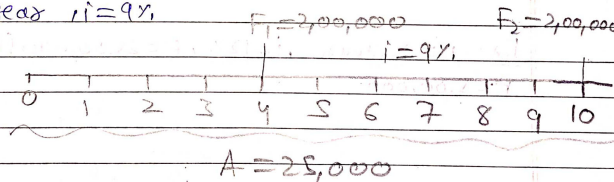
A $=$ 25,000

PWI(P_1) $= F_1$, $n_1 =$ 4 years , i $=$ 9%

PWI(P_2) $= F_2$, $n_2 =$ 10 years , i $=$ 9%

Total PWI $= P_1 + P_2$

$$P_1 = \frac{F_1}{(1+i)^{n_1}} = \frac{2,00,000}{(1+0.09)^4} = 141685.04$$

$$P_2 = \frac{F_2}{(1+i)^{n_2}} = \frac{2,00,000}{(1+0.09)^{10}} = 84482.16$$

Total PWI $=$ 141685.04 $+$ 84482.16 $=$ 226167.2

$$P = A\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right] = 25000\left[\frac{(1+0.09)^{10} - 1}{0.09(1+0.09)^{10}}\right]$$

$=$ 160441.44 (PWO)

NPW $=$ PWI $-$ PWO $=$ 226167.2 $-$ 160441.44 $=$ 65725.76

NPW $>$ 0 [ACCEPT].

2. Future worth method $-$ a) Identify cash inflows and outflows.
b) calculate future worth of inflow.
c) calculate future worth of outflow.
d) calculate (NFW) Net future worth.

NFW $=$ FW(inflow) $-$ FW(outflow)

e) compare NFW with 0
NFW $>$ 0 (ACCEPT)
NFW $<$ 0 (Reject)
NFW $=$ 0 (Your choice)

EX $-$ n $=$ 20 years , i $=$ 12% , F $=$ 25,00,000 (FWI)

P $=$ 5,00,000

F $=$ 25,00,000

i $=$ 12%

n $=$ 20 years
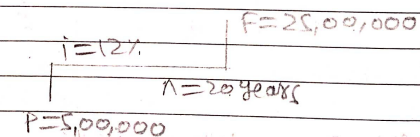
P $=$ 5,00,000

F outflow $= P(1+i)^n = 5,00,000(1+0.12)^{20} = 4823146.54$

NFW $=$ FWI $-$ FWO $=$ 25,00,000 $-$ 4823146.54 $= -2323146.54$

NFW $<$ 0 [Reject].

3. Annual equivalent worth (AEW)

a) Identify cash inflow and cash outflow.

b) Calculate the present worth of inflow and outflow.

c) Calculate the net present worth.

d) Evaluate AEW.

e) Compare AEW with 0.

if $AEW > 0$ (accept)

$AEW < 0$ (reject)

$AEW = 0$ (your choice)

$$NPW = PW_{inflow} - PW_{outflow}$$

$$AEW = NPW \left[\frac{i(1+i)^n}{(1+i)^n - 1} \right]$$

$F_1 = 50,000 \quad i = 5\% \quad F_2 = 1,00,000$

$0 \quad 1 \quad 2 \quad 3 \quad 4$

$1,20,000$ (outflow)

$P_1 = n = 2yr, \ i = 5\%, \ F_1 = 50,000$

$P_2 = n = 4yr, \ i = 5\%, \ F_2 = 1,00,000$

$$P_1 = \frac{50,000}{(1+0.05)^2} = 45351.47$$
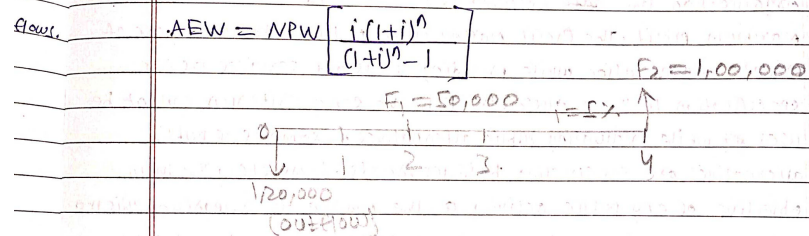
$$P_2 = \frac{1,00,000}{(1+0.05)^4} = 82270.24$$

Present worth inflow $= P_1 + P_2 = 127621.71$.

$$NPW = PW_{inflow} - PW_{outflow} = 127621.71 - 1,20,000 = 7621.71.$$

$$AEW = NPW \left[\frac{i(1+i)^n}{(1+i)^n - 1} \right] = 7621.71 \left[\frac{0.05(1+0.05)^4}{(1+0.05)^4 - 1} \right] = 2149.41$$

Cost Benefit Analysis – The question to which cost benefit analysis addresses itself is weather it is socially desirable to undertake the number of projects A, B, C, D etc. and if investable funds are limited then how many of this should be selected. Since the choice involves maximization we have to discuss want it is that investment planners wish to maximize. In general terms an investment planners wants to maximize the present value of all benefits less that of all cost subject to specific constrain. It is general formulation rises the following the specific question the answer to which provide general Principle of cost benefit analysis.

While selecting or evaluating alternative of private organication the criteria is to select the alternatives with maximum profit. The profit maximization is the made more of private organization while providing goods and services as per specification to there customers. But the same criterion cannot be used while evaluating public alternatives. Examples of public alternatives are constructing bridges, roads, dams, etc. The main objective of any public activity for the purpose of comparition this are to be converted into a common time base present worth or future worth or annual equivalent.

Similarly, the cost are to be converted to a common time base as done in equivalent benefits. Now the ratio bet the equivalent benefits and equivalent cost is known as benefit cost ratio.

$$BC \ ratio = \frac{equivalent \ benefit}{equivalent \ cost}$$

If this ratio is atleast one the public activity is justify otherwise it is not justify.

Linear Gradient Series
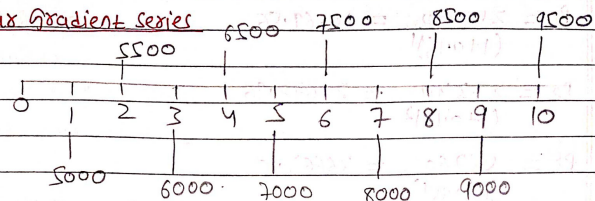
$A_1 = 5000$, $G = 500$, $i = 12\%$, $n = 10$ yr.

$$A = A_1 + G\left[\frac{(1+i)^n - in - 1}{i(1+i)^n - i}\right]$$

$$= 5000 + 500\left[\frac{(1+0.12)^{10} - 0.12 \times 10 - 1}{0.12(1+0.12)^{10} - 0.12}\right] = 6792.32.$$

$$F = A\left[\frac{(1+i)^n - 1}{i}\right] = 6792.32\left[\frac{(1+0.12)^{10} - 1}{0.12}\right] = 119196.62.$$

Q. The project cash flow of an investment proposal is given as+

End of year	Net cash flow
0	75000
1	24000
2	27340
3	55760

Evaluate the ~~desirable~~ desirability of project when $i = 15\%$.

(Ans)
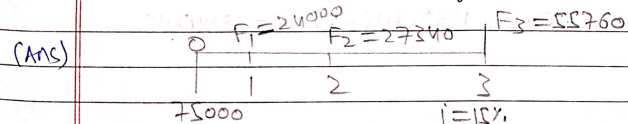
$PWO = 75000$

$PWI = P_1 + P_2 + P_3$

$NPW = PWI - PWO$

$$P_1 = \frac{24000}{(1+0.15)^1} = 20869.56$$

$$P_2 = \frac{27340}{(1+0.15)^2} = 20672.96$$

$$P_3 = \frac{55760}{(1+0.15)^3} = 36663.10$$

$PWI = P_1 + P_2 + P_3 = 20869.56 + 20672.96 + 36663.10 = 78205.62$

$NPW = PWI - PWO = 78205.62 - 75000 = 3205.62$ (Accept).

Q. Future worth of the project at the end of 3 yrs. interest is 15%. came as above table and same value.

(Ans) $FWO = 55760$, $P_0 = 75000$, $P_1 = 24000$, $P_2 = 27340$

$\Rightarrow F_0 = P_0(1+i)^n$ $i = 15\%$, $n = 0, 1, 2$

$F_1 = P_1(1+i)^n$

$F_2 = P_2(1+i)^n$

$FWI = F_0 + F_1 + F_2$

$NFW = FWI - FWO$

$F_0 = P_0(1+i)^n = 75000(1+0.15)^0 = 75000$

$F_1 = P_1(1+i)^n = 24000(1+0.15)^1 = 27600$

$F_2 = P_2(1+i)^n = 27340(1+0.15)^2 = 36157.15$

$FWI = F_0 + F_1 + F_2 = 75000 + 27600 + 36157.15 = 138757.15$

$NFW = FWI - FWO = 138757.15 - 55760 = 82997.15.$

Depreciation

- Definition
- Causes of Depreciation
- Method of calculating depreciation

Depreciation is the loss of value of the physical assect used in production. Whenever any machine or equipment performs useful work we undergoes some wear and tear which can be minimized to some extend by proper care and maintenance. But it cannot be totally prevented. It efficiency should be reduces with the lacks of time and at one point at time it becomes uneconomical to be used further and needs replacement by another new unit. Therefore we can say that efficiency and the value of machine or assect constantly reduces with the lacks of time during use which is known as depreciation.

So some money must be sent assign yearly from the profit. So that when the equipment becomes uneconomical it can be replaced by the new one. The money which is deducted yearly is called depreciation charge. This amount of money is deposited in a fund for depreciation fund or sinking fund.

19.2.22

Causes of Depreciation

1 - Principal depreciation - It is a known fact that when any machinery performs work wear and tear of certain components takes place. Although sufficient precautions are taken. for example, proper lubricating, and cooling is done which minimize wear and tear but cannot be totally prevented. So the cost of replacement because of this is the value of depreciation due to wear and tear.

2- Depreciation due to physical decay - There are certain items in a factory such as insulation of materials, furniture, electric cables, poles, buildings, chemical vessels which get decay because of climatic and atmospheric effect. With the result the value of this articles goes on reducing with the lapse of time. Although every effort is made by the owner to keep them in serviceable condition. Even then because of climatic and atmospheric effect there will be reducing in their cost. This reducing in cost is called depreciation due to physical decay.

3- Time factor - There are certain accept with have fixed legal period of time. Such as lease, patents writes and copy writes which use there value after his lifetime. This is the depreciation due to time factor.

4- Depreciation due to accident or sudden failure - An accept may reduce a value because of leading of an accident although the machine might have been installed a few days back and sufficient care is taken to prevent accident even then accidents may occur due to some wrong operation or for some defective components which result in heavy damage. So the depreciation in machine due to this is called accidental depreciation.

5- Depreciation due to depletion - Some accept like mines, quarries and oil well are of wasting character perhaps due to extraction of raw materials from them this cause depreciation.

6- Depreciation due to deffered maintaince and neglect
Every manufacturer supplies certain instruction for the smooth and efficient running of an equipment. Now if there instructions are not properly followed because of neglect and if proper maintaince is not done as recommended by manufacturer then the value of

vehicle will be reduce and depreciation occur.

7- Depreciation due to inadequacy or functional depreciation

Inadequacy has 2 meaning firstly it means reducing in efficiency of the accept in the lapse of time. This fall in the efficiency will reduce the value of accept causing depreciation. Second thing in adequacy refers to the termination of the use of an accept because of growth and changes in the size of the firm. If a factory cannot scope with the increase demand additional money will be needed to replace the bigger size machinery or to install small machinery. This is called depreciation due to inadequacy.

8- Depreciation due to obsolescence or Technological Depreciation
obsolescence means the process becoming obsolet or out of dead due to introduction of new module is produces more than the old machinery. Now if the product produced by the new are much cheaper and better than the existing one, then the existing machinery has to be replaced to withstand market competition. This is called depreciation by obsolescence and it is of functional type.

21.2.22
Notations
P = Purchase price + sells tax
S = Salvage value or future value at the end of the asset life or it is the expected selling price of propety when the asset is no longer in use.
N = useful life of asset or no. of years.
$D_t(n)$ = annual depreciation charges.
$B_t(n)$ = Book value shown at the accounting record at the end of the year.

$Bt(0) = P$

<u>Straight line method</u> — It assumes that the value of an asset decreases at a constant rate. Ex — If an asset has first cost ₹5000 salvage value after 5 years is 500 what is the depreciation charge?

$P = 5000, S = 500, N = 5yr.$

$Depre = \dfrac{P - S \text{ or } F}{N} = \dfrac{5000 - 500}{5} = 900.$

End of 'o' year	Depreciation charge	Book value at the end of the year
0		P
1	$\dfrac{P-F}{N}$	$P - 1\left(\dfrac{P-F}{N}\right)$
2	$\dfrac{P-F}{N}$	$P - 2\left(\dfrac{P-F}{N}\right)$
3	$\dfrac{P-F}{N}$	$P - 3\left(\dfrac{P-F}{N}\right)$
n	$\dfrac{P-F}{N}$	$P - n\left(\dfrac{P-F}{N}\right).$

Q. $P = 5000, S \text{ or } F = 0, N = 5yr$
Evaluate the annual i) Depreciation charge ii) depreciation severe for 3 yrs. iii) Book value for the 3rd yr.

Ans) i) $\dfrac{P-F}{N} = \dfrac{5000 - 0}{5} = \dfrac{5000}{5} = 1000$

ii) $1000 + 1000 + 1000 = 3000$

iii) $P - 3\left(\dfrac{P-F}{N}\right) = 5000 - 3 \times 1000 = 2000,$

Q. Computers purchased by a public utility cost ₹25000 each. Past records indicate that they should have a useful life of 10 yrs. after which they will be desposed of. with the salvage value of ₹2000 each. Determine i) depreciation charge during 1st yr. ii) depreciation charge during 2nd yr. iii) depreciation severe. accompleted in 3 yrs. iv) The book value of computers at the end of 3 yrs.

(Ans) $P = 25000, S = 2000, N = 1 yr$

$Dt(1) = Dt(2) = \dfrac{P - F}{N} = \dfrac{25000 - 2000}{10} = 2300$

$Reverse = 3 \times 2300 = 6900$

$P - 3\left(\dfrac{P-F}{N}\right) = 25000 - 6900 = 18100.$

25.2.22

<u>Declining method of Depreciation</u>

$P = 5000, F \text{ or } S = 1000, n = 5 yr.$

	Dt(a)	Book value
1st yr. (30%)	0.30×5000 $= 1500$	$5000 - 1500 = 3500$
2nd yr. (30%)	0.30×3500 $= 1050$	$3500 - 1050 = 2450$
3rd yr. (30%)	0.30×2450 $= 735$	$2450 - 735 = 1715$
4th yr. (30%)	0.30×1715 $= 514.5$	$1715 - 514.5 = 1200.5$
5th yr. (30%)	0.30×1200.5 $= 360.15$	$1200.5 - 360.15 = 840.35.$

$Dt(a) = a \times BKV_{t-1}$

$BKV = B_{t-1} - Dt$

National income

- Def^n
- Terms related to it
- Methods of measuring

National income is used to measure economic growth. It enables us to find out the performance of the economic in terms of the targets set for the growth of the economic. The Planners and the policy makers of the country will be able to know whether they have attain success in their efforts to promote growth to a desirable extend. Expressed in a common currency the national income help us to get a comparative picture of the economic growth of different countries.

In real terms national income is defined as the flow of goods and services produce in an economic during a particular period of time, usually a year. To estimate national income in real terms is a difficult task. This is due to the fact that different units of measurement are used for different goods and services. Therefore, money is considered as a common unit for measuring national income. Therefore national income can be defined as the money measure of net aggregate of all goods and services produces to be inhabitance during a specific period.

26.2.22

National income is viewed in 3 ways:-
1. National Product 2. National Income 3. National Expenditure.

1. National Product - National product consists of all goods and services produced by the community and exchange for money during a year. It doesnot include the goods and services which are not pay for i.e, hobbies, housewife service, charitable work, etc.

2. National Income - It is the flow of income in cash and time paid out to households in return of supply of productive services + profits retained by firms as reserves.

3. National Expenditure - The sum of expenditure on consumers goods and investment goods, government expenditure and expenditure by foreigners on our exports less domestic expenditure on imports constitute national expenditure.

Terms related to national income

1. GNP at MP   2. NNP at MP   3. GNP at FC   4. NNP at FC
5. GDP at MP   6. NDP at MP   7. GDP at FC   8. NDP at FC.

When production takes place output flows to the firm and income is generated in the form of rent, wage, interest and profit which is given to the factors of production. In this situation what ever is the output of the firm it is the income of the factors engage in production. Again output produce by a firm is sold in the market at a price. Similarly when production takes place the firm makes an expenditure to produce the output. Therefore, national product can be viewed as national product at market price and national product at factor cost.

1. Gross National Product at market price (GNP at MP)
Gross National Product is a broader concept. It is not confined to the domestic territory of a country. National product includes the net income of labour and property employed in the rest of the world in addition to all the constitute of gross domestic product.

The Gross national product at market price is defined as the market value of final goods and services produced in the domestic territory of a country by normal residency during an accounting year including net factor income from abroad.

GNP at MP = GDP at MP + Net factor income from abroad.

$$GDP_{MP} = P \times Q$$

P = market price of final goods and services.
Q = total quantity of final goods and services.

Net factor income from abroad is the difference between factor income earn from abroad by the normal residence of a country and income pay for the factor services rendered by the non residence within the domestic territory of the country.

It is important to note that when net factor income from abroad is positive GNP will be greater than GDP when it is negative GNP will be smaller than GDP. If net factor income from abroad. is 0 then GNP is equal to GDP.

28.2.22

2. Net National Product at Market Price — When goods and services are produced there is some wear and tear of the machines or fixed capital. This wear and tear of machine is called consumption of fixed capital or depreciation. If we deduct the value of depreciation from the value of GNP we get net national product. In other words net national product at market price is the market value of the output or final goods and services produced by normal residence of an economy in its domestic territory during an accounting year exclusive of depreciation and inclusive of net factor income from abroad.

$$NNP_{MP} = GNP_{MP} - depreciation.$$

3. Gross National Product at Factor Cost — The firm needs land labour capital and entrepreneur to produce goods and services. In

exchange this factors receive there remuneration in the form of rent, wage, interest and profit. This payments to factors are called production cost or factor cost. From the viewed point of the firm it is cost and the viewed point of the factors it is income.

GNP at FC is defined as the value of all final goods and service produced at MP within domestic territory of the country in an accounting year including net factor income from abroad — net indirect tax.

$$GNP_{FC} = GNP_{MP} - net\ indirect\ tax.$$

Net indirect tax is the difference between indirect tax and subsidy. Indirect tax is the tax imposed on production and sale of commodities while tax increases the market price of commodities subsidy decreases the MP. Net indirect tax is calculated by deducting subsidy from the indirect tax. GNP at FC is also called national disposable income.

$$GNP_{FC} = GDP_{FC} + NFIA.$$

4. Net National Product at Factor cost — It is also called national income. If we deduct depreciation allowances from the GNP at FC we get NNP at FC. In other words NNP at FC is the sum of total of net value added by all the producers in the domestic territory of the country + net factor income from abroad.

$$NNP_{FC} = GNP_{FC} - Depreciation$$
$$or\ NNP_{FC} = NDP_{FC} + NFIA.$$

5. Gross Domestic Product at Market Price — The total money value of final goods and services produced by all the producers within the domestic territory of the country during one year is

called GDP at MP. Producers may be residence producers or non residence producer. But they must operate within the domestic residence producer. But they must operate within the domestic territory of the reporting country. In other words GDP at MP is defined as the market value of output of final goods and service produced in the domestic territory of a country by all the producers during an accounting year. The value of GDP can be calculated by multiplying total quantity of final goods with price.

$$GDP = P \times Q$$

P = market value of final goods.

Q = quantity of final goods and services produced during an accounting year within the domestic territory of the country.

GDP at MP = Value of output in domestic territory – Value of intermediate consumption = Gross value added at MP.

6. Net Domestic Product at Market Price – It is otherwise called the net value added at MP within the domestic territory of the country. It is the market value of final goods and services produced within the domestic territory of a country during an accounting year – depreciation.

2.3.22

In other words net domestic product at market price is the market value of final goods and services, produced in the domestic territory of a country by its normal residence and non residence during an accounting year less depreciation. The formula is:-

$$NDP_{MP} = GDP_{MP} - Depreciation.$$

NDP at MP can also be calculated by deducting net factor income from abroad from net national product at market price.

7. Gross Domestic Product at Factor cost – Production is the cooperative working of all factors of production land, labour, capital, and enterprise. In exchange they receive their enumeration in the form of rent, wage, interest and profit. This payments to factors are called production cost or factor cost. From the viewpoint of the firm it is cost and from the viewed point of factors it is their income.

GDP at FC is also called gross domestic income. It is equal to the gross value added at factor cost. In other words the GDP at FC is the sum of net value added by all the producers in the domestic territory of the country and consumption of fixed capital during an accounting year.

GDP at FC = Net domestic product at FC + depreciation.

$$GDP_{FC} = GDP_{MP} - Indirect tax + subsidy$$
Net Indirect Tax = Indirect tax – subsidy.

The difference between GDP at FC and GDP at MP is that GDP at FC includes all the elements or GDP at MP except net indirect tax.

$$GDP_{FC} = GDP_{MP} - net indirect tax.$$
$$GDP_{MP} = GDP_{FC} + net indirect tax.$$

8. Net Domestic product at Factor cost – NDP at FC is also called Net Domestic Income. This is because what is cost for the firms is income for the factors. NDP at FC is equal to the net value added at FC.

In other words Net domestic Income is the income generated in the form of wage, rent, interest and profit. In the domestic territory of a country by all the producers normal

residence and non residence in an accounting year. Thus we can say
the NDP at FC is the sum total of net values added by all the
producers in the domestic territory of the country during an
accounting year.

<u>Constituent</u>
1. NDP at FC — It includes all the elements of NDP at MP or net value
added except net indirect tax.

$$NDP FC = NDP MP - net\ indirect\ tax.$$

2. <u>Net Domestic Factor Income [NDFI]</u> — The constituent of
NDFI are wage, rent, interest and profit received by the factors
of production. In India NDFI includes:
a) Compensation of employees which includes wages in cash or kind.
b) Contribution of employees whose social security on the behave of
the employees.
c) Pension to the retired employees.
d) Operating circus which includes rent, interest and profit.
e) Mixed income of self employee.

<u>Methods of measuring National Income</u>
The flow of national income is divided under 3 phases at different
level of production. This refers to measurement of national income of
any country by measuring money value of final goods which belong
to the country or net national product during a year.

1 — <u>Value added method or final output method</u> — In this method we
estimated the GDP at MP and we estimate it by multiplying physical
output with MP, then we calculate the value of intermediary
consumption by adding the prices paid by each enterprice for
purchase of goods and services. In this method firstly the

producer show divided the economy into primary, secondary and
tertiary sector. Secondly they have to find out the value of output,
value of intermediary goods, consumption of fixed capital or
depreciation.

Net value added at FC = Net value added MP — net indirect tax MP.

2 — <u>Income method</u> — At this level individual receive income for
work and property. So, measurement of national income in income
method shows the measurement at the level of distribution. The
net value added is distributed as the reward to the factors of
production. national income is the aggregate of factor reward.
In this case, classification of production is made into primary,
secondary and tertiary sector.

a) <u>wages and salaries</u> — The reward for the physical work is called
wage and the reward for any type of mental work is called as
salaries.

b) <u>Rent and interest</u> — It is a income from property which are
given in terms of production. So the rent and interest are owned by
factor owners.

c) <u>Gross profit</u> — It is the reward for risk bearing in business
which include divident undistributed profit, coorporation tax.
Thus income method is called factor payment method or flow of
income method.

Income method measures from the site of the payments. This
payment may be factor income like rent, wage, interest, profit.
while preparing national income under income method we must
add total factor income generated in the country but not transfer
payment.

Precautions or items excluded from income method.
1 - Transfer payment not included. EX - Pension.
2 - Income from lottery.
3 - Income from second hand good are not included in national income.

4.3.22

Expenditure method - Income generated out of production after distribution is spent on consumption. The method of measuring national income at the level of consumption is known as expenditure method. Under this method, we determine the final expenditure on GDP to determine national income. Final expenditure or expenditure on final goods can be classified into consumption expenditure, investment expenditure and net expose of goods.

Again, expenditure on consumption may be divided into consumption of household and consumption of government sectors. Therefore, the expenditure on final goods has 3 components this are:-

a) Final consumption expenditure - This refers to the expenditure on final goods for want satisfaction incurred by private and government sector.

Private final consumption expenditure is done by household consumers and profit making private institutions.

Government final consumption refers to the government expenditure on general administration, defence, law and order, education, water supply.

b) Investment expenditure - It refers to expenditure on gross capital formation such as expenditure for formation of gross fixed capital and expenditure on change in stock. Gross fixed capital formation refers to expenditure for formation of physical capital such as construction and expenditure on machinery, ant

equipments. Change in stocks is the expenditure for making production going on or expenditure on raw materials, semi manufacture goods and manufacture goods.

c) Net exports of goods - Resident of a country import goods and services from abroad. Services here means non factors services like shipping, insurance, etc. Resident on that country living abroad also make purchases abroad. This constituent import of goods and services. On the other hand foreigners also make expenditure on domestic goods and services. Also residence deciding abroad make direct purchase within the country. This constituent export of goods and services. The difference between export and import is known as net exports of goods and services.

7.3.22

Steps to measure national income

First we have to add expenditure on final goods under different heads such as private consumption expenditure, government consumption expenditure, investment expenditure and net export of goods and services. The aggregate of final expenditure under above heads will show expenditure on domestic product or domestic product act market price.

Second adding net factor income from abroad to domestic product at market price, we get national income at market price. For optimizing national income at market price.

Precautions - The following precautions should be adopted by measuring national income by expenditure method.
a) Expenditure on second hand goods should not be included.
b) Expenditure on purchase of both new and old shares by people should not be included.
c) Government expenditure on transfer payments such as old age

mension are excluded.
d) only expenditure on final goods and services is to be included.

$$NI = C+I+G+(X-M).$$

Inflation
— Definition
— Types of inflation
— causes of inflation
— Effects of inflation

Inflation is the situation where the value of money that is the prices are rising. Here the prices of all goods and services rises continuously with no corresponding increase in output of employment.

Types
On the basis of intensity of price rise inflation is of 4 types:-
1— Creeping — In this case, we rise in price rises between 3% to 7%. It is safe for economic growth.

2— Trotting/walking — If rise in price is in single digit in a year. It is a warning for the government to control inflation.
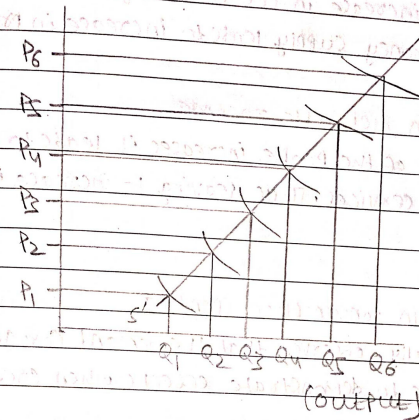
3— Running/Galloping — The rise in price is between 10% to 20% which is a serious problem for the economy.

4— Hyper inflation — The rise in price level is more than Galloping inflation.

Causes of Inflation
→ Demand pull inflation.
→ Cost Push inflation.

(output)

Demand pull inflation occurs when there is excess demand over available supply at existing price.
• It leads to increase in aggregate demand. supply remaining constant.
• Initially the price increases along with increase in output, after full employment is reached only price increases with increase in demand. supply remaining constant.
• In the diagram SS' is the supply curve, initially the demand increases d₁d₁ subsequently till d₄d₄.
• Both the corresponding output & price increases.
• output increases from Q₁ → Q₄ & price increases from P₁ → P₄.
• After Q₄ level of output the supply remains constant & only the demand increases which shows at d₅d₅ & d₆d₆. The price increases to P₅ & P₆ but the supply remains constant.
• This is the situation of demand pull inflation.

Causes of Demand Pull inflation

Explanation

1. **Increase in Quantity supply of money**
   When there increase in credit supply by the banks there will be a increase in money supply leads to increase in price level.

2. **Increase in disposable Income**
   When income of the people increases it leads to increase in demand for goods & services. Thus leaving to increase in consumption expenditure.

3. **Increase in consumption spending**
   It is generally observed that the demand for goods & services increase due to demonstrate effects when credit facilities are given.

4. **Deficit Financing**
   • Deficit financing refers to a situation when increases by transfer of money from the central bank to the commercial bank.
   • This in turn leads to expansion of credits facilities to the general population increasing the circulation of money in the hands of the people, which leads to increase in demand for various commodities leading to increase in price level.

5. **Expansion in Private sector (EIPS)**
   EIPS leads to increase in disposable income in the hands of the people which leads to demand pull inflation.

6. **Black Money –**
   Black money increases the circulation of the money in hands of people leading to demand pull inflation.

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7. **Increase in Export**
   When a country exports different commodities to trading activities.
   • It leads to inflow of money from outside country to the domestic territory of the country.
   • This leads to demand pull inflation.
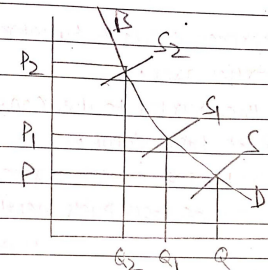
• The cost push inflation occurs when price rise on account of increasing in price of raw materials, intermediate goods & all increase in rate when cost of price increases receive the supply curve rises, indicating less is supply at higher price leading to increase in price level.
• In the diagram BD is the S & supply curve shifts to the left to S_2S_2 respectively.
• The output decreases from OQ to OQ_2 & price increases from OP to OP_2.

Causes of cost push inflation

Higher wage rate
• This concept leads to wage push inflation it is to the trade union workers, the labourers are able to achieve higher money wage to collective bargaining without a corresponding increase in productivity causing upward shift in supply to increase in total cost.

• Higher profit margin sometimes monopolistic & oligopolistic
producers to increase their profitability increase price.
• Increase price till the situation leads to constant push inflation.
• This refers to profit push inflation.

Higher tax

• Government may increase constant by introducing the variety of
tax increase in tax particularly.
• The producer shifts the burden to the consumer to increase prices.
• Availability of prices of basic input.
• A price rise of general input causes a general increase in price
level & becomes a source of cost push inflation.

12.3.22

Effects on inflation

1. Effect on Producers- Creeping inflation is quite desirable as it
leads to expansion in production, economic action leading to more
profit situation. After full employment is reached. Mild inflation
takes form of hyper inflation.
• The producers find it benificial code the things so that they can
sell it when the price is high.

2. Effects on distribution -The producers, manufacturers and big
farmers gain from inflation as the prices of the product themselves
increase more than the cost of production.
• For the farmers it is a benificial situation because as debtors
have to give back less in terms of goods to the crediters.
• Debters are those who borrow money & repay in future, they gain
during inflation because as the real income goes down, they have to
pay less to the creditors in terms of real value & they stand to
lose.

3. Effects on Investment – Investment on debentures which yield
fixed rate of interest implation is not a benificial situation for
them.
• For the fixed income good where the cost of the living index rises.
• So fixed income through & pension holder lose during inflation.

Control of inflation

Methods

• Inflation refers to a situation where there is heavy rise in price
of commodity.
• Initially the phase of inflation is welcomed by the nation as it
impleases economic growth but after a certain level it reaches
to hyper inflation which needs to be controlled as it is dangerous
to the society.
• In all the methods of controlling inflation they aim at demanding
for goods & services by reducing the disposable income to some
extend. There are mainly two methods to control inflation.

Monitary measure

• The central bank adopts a cheap functionary of monitory policy
to check inflation.
• It 1st check increase in volume of currency & to avoid bank
credit given to the public to qualitative & quantitative measure
to control inflation.

Bank Rage –The central bank increases the rate of interest
which will increase market interest. It becomes expensive for the
people to have transaction with in time.
• Therefore, the money supply in the hands of the people which
checks excess demand.
• Thus demand pull inflation is reduced.

Open market operation

• With the sell of government security the money supply will be reduced as the commercial bank has to pay back the money to the central bank for purchasing government security.

• The money supply to the commercial bank the money supply is reduced & it is discouraged to the advancement of one to the general public.

Thus disposable income in the hands of people reduces & demand of goods & services decreased with decreasing inflation.

Cash reserve ratio

CRR is the amount of money that commercial bank has to deposit in the central bank as government. When the commercial bank has to deposit more amount of money to the central bank then the amount of money to the central bank is reduced for transaction & in opposite situation. When the commercial bank deposits less amount of money with the central bank then the money for the transaction increases. Therefore during the transaction the credit facilitial are reduced during down payment & reducing payment link in terms of selective basis of control inflation.

Fiscal method

• F.M includes the step taken by the government to control inflation.

1. Public expenditure - Government can reduce P.E which will reduce the public money circulation in the market hence demand for goods & services gets reduced.

2. Taxation - In-crease in tax reduces the purchasing power in the hand of people as max. percentage of money income is reduced through direct tax.

Thus decreasing the disposable income in the hands of people

direct as like income tax, wealth tax, expenditure tax, reduced disposable income in the hands of the people.

21.3.22

Q. What is Central Bank? Explain the func) of central bank?

(Ans) Central bank is the institution that manage its state currency and money supply interest. Central bank usually oversea the commercial banks. It checks the func) of commercial banks. The central bank possesses the monopoly of increase in the monetary base in the state and usually playing national currency. The RBI is covered by the central Board of Directors. The board is appointed by the government of India for a period of 4 years. It consists of governer and deputy governer. There are 4 deputy governer nominated by the government 10 directors from various fields and 2 government officials and other 4 directors from local good.

Func) of Central Bank

1. Bank of issued - Central bank now a days have monopoly of note issue in any country. The currency notes printed and issued by the central bank are declared having legal tender through out the country. The RBI has to give gold or silver or other securities against note issued. The main objective of note issued is people confidency in the currency maintained by the central bank. It supply its adjusted in the demand of economy.

2. Bank curve, agent and advisor to the government - Has the bank curve to the government it receives payment on the behave

of the government. It advances short term loan to the government to overcome difficulties.

3. Custodian of cash reserve — All commercial bank in a country is a part of there cash balance at deposits in the central bank which may be on convention of legal combustion. The centralisation of cash reserve with the RBI become a source of larger elastic credit structure cash reserve can truthfully be utilised.

4. Custodian of national foreign exchange reserve — The RBI is not only an adjust of government for internal issued but also for external issued. It tries to keep whole reserve to maintain external value of hope currency to meet the deficient of foreign exchange demand.

5. Lender of last reserve — During financial stringency it grants to help the commercial bank, government and public for creation of credit. It grants help to the commercial bank by re-discounting of bill of exchange and gives there money to meet the trsies. It lent the money to the government against government security.

6. Credit control — This is a major funct of RBI has credit forms the bases of public and industrial expansion. Therefore, some major credit control majors at taken into consideration.

<u>Methods of credit control</u>

1. Quantitive credit control — It attains to control the total volume of credit.

<u>Bank rate or discount rate</u> — This is the rate at which the central bank discounts bill of exchange when bank rate increases the

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commercial bank paid high rate of interest to rediscount his bill of exchange. This affects general customer of commerskial bank rising rate of interest leading to increase profit.

<u>25.3.22</u>

<u>Open market operation</u>

In open market operation there is direct intervention of the central bank in the money market by selling and purchasing of securities. When it buys securities from commercial bank and other financial institution. It injects money flow to money market. Thus money supply increases leading to expansion of credit, when the central bank ... ceives securities with cash reserves becomes less and money supply decreases. Thus it leads to constraction of credit.

<u>Cash reserve ratio</u>

Cash reserve ratio is also called CRR or Cash Reserve Requirement. This a new method of RBI to increase or decrease money supply. It tries to regulate the CRR which commercial bank has to maintain with the reserve bank of India. This helps in increase or decrease with money supply and credit control.

<u>Selective credit control or Qualitative credit control</u>

The central bank directly affects the bank credit only in those sectors of the economy where we want to approved them by selecting burrower eligible for the credit.

1. Margin requirement is fixed for granting loan.

2. Regulation of consumer credit — In this system the central bank helps in regulating terms and condition for consumer credit.

3. Differential interest rate - In this case if the reserve bank of India does not lying a particular time of trade. It fixes high interest rate to discourage credit facilities and if the central bank wants to increase the money supply it fixes a low interest rate to encourage credit facilities.

4. Raporate or repurchase rate is the benchmark interest rate at which the reserve bank of India lends to all other banks for a short term. When a raporate increases borrowing from a RBI becomes expensive. Hence, the consumers or the public has to bear the outcome of high interest rate.

Banks - Banks are institutions which accept deposits of money from the public and lend it to others.

Func^ of a Bank
1. Accepting deposits of money from the public to use the deposit by lending it to those to need it.

2. Give loans.

3. Different financial institution also accepts deposits and give loans. The difference bet^ banks and the institution is that bank transaction is widely accepted in the central bank of depts.

Commercial bank - A commercial bank is one which deals in short run credit. It accepts deposits from the public and lends money to the people for productive purposes. It also provide financial for trade and discounts, bill of exchange.

Acceptance of deposits
The commercial bank borrow money in form of deposits from the people who have excess money with them or excess savings which can be deposited in the bank.

Current deposit/Demand deposit
A deposit in a current account can be withdrawn at any time from the bank with the help of checks.
→ The banks charge a very small interest rate. Traders businessman who have daily transaction keep their money in this account.

Fixed deposit
These are those deposits which cannot be withdrawn before expiry period for which deposits are made. The rate of interest is higher for longer period and lower for shorter period.

Savings bank deposit
The deposits are deposit in the saving account, they accept small deposits.
→ This deposits are at a lower rate of interest.

Reocurring deposit
Under this type of deposit the deposit is requris to deposit a fixed amount of money for a specific time, which may vary from a year to 10 years. After the completion of the time period the depositor can withdraw the money with the interest rate.

Miscellaneous deposits
Apart from different types of deposits the banks have introduced home construction deposit scheme. For example sickness benifit deposits children gift plan, old age pension scheme etc.

Agency function of commercial bank

It acts as a representative of its customers.

Remenance of fund

When large sum of money have to be send to the distance places then remenance of funds is done by the banks through mail transfer/ graph .. on behalf of the branches to other banks.

Collection & payment

Commercial bank on behalf of its customers collects checks bill of exchange, pay order, branch.. charge a small commission.

3. Trusteship - Some times banks are asked to become the trustees of the properties in the interest of the customers.

4. Representation & correspondance - The commercial bank act as a representative of its customers in case of securing passport/any requirements.

5. Purchasing & selling of securities - Banks employees their customers whether anyone will purchase/sell securities & also purchase securities on behalf of their own customers.

6. Safe custody of deposit - People keep in the bank their valuables like jewellery cash & documents in a .... nominal price.

31.3.22.

3) Credit creation of commercial Bank

The main source of fund in a bank is acceptance of deposites from general public. The bank opens an account in the name of the depositer who deposits the money. The loans are advanced from the primary deposite bank advanced loans after complition of paper

walk with a security by creating a deposite of account in the name of the debtor.
→ Bank also issues check books to the one who takes the loan to draw money whenever necessary. For this reason it is said, every loan creates a deposite.
→ The loan deposite is called derivative or active deposite.
→ Again the amount of Bank money create a depends both on the amount of cash which people deposite with the banks and the percentage of reserve of cash which people deposite with the banks and the banks find its necessary the percentage of reserve of cash which the banks find the necessary to hold in order to meet the demand for producing of depositor and cash reserve ratio of central bank.